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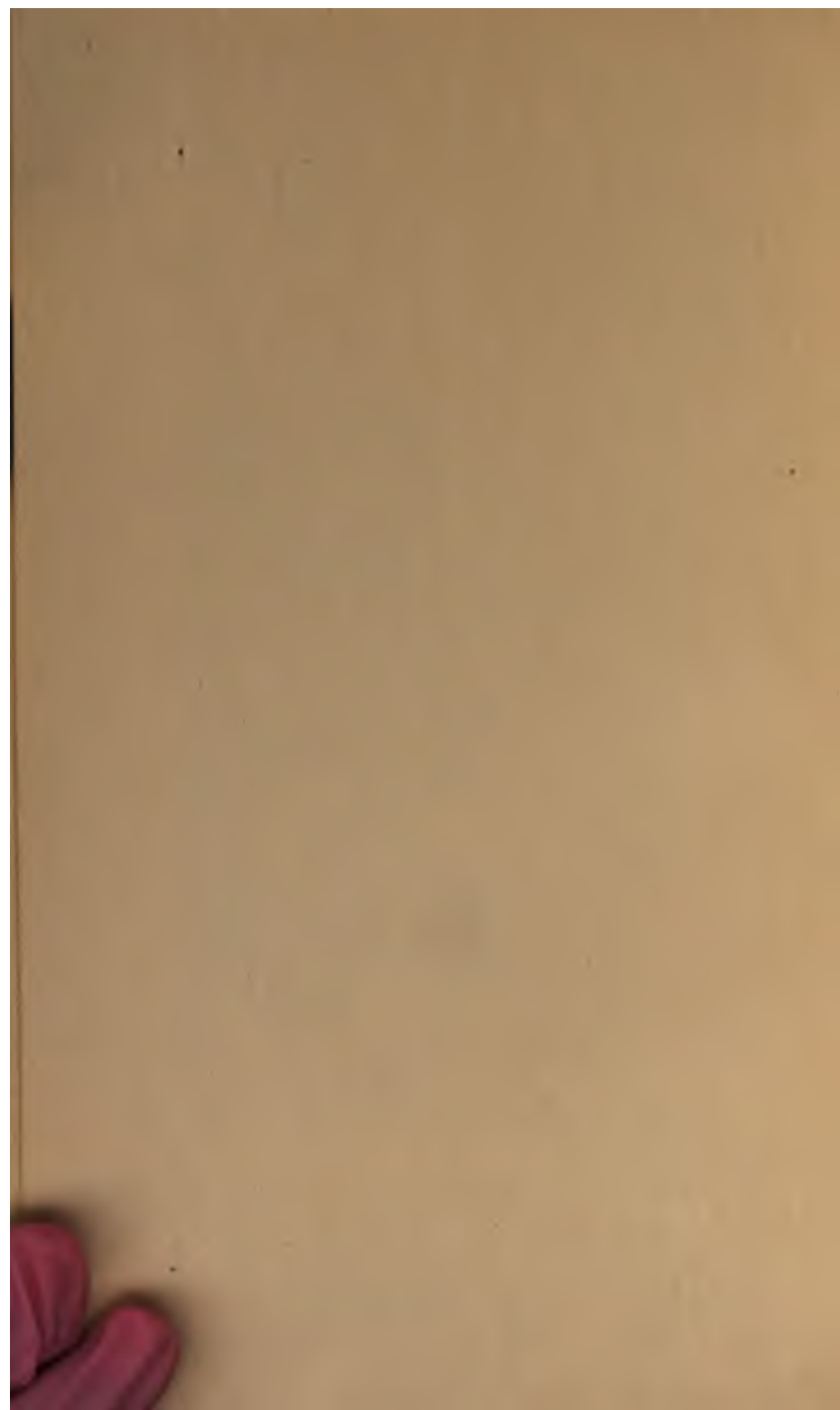
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**LIFE AND WORK
AT THE GREAT PYRAMID.**

VOL. III.

EDINBURGH : PRINTED BY THOMAS CONSTABLE,

FOR

EDMONSTON AND DOUGLAS.

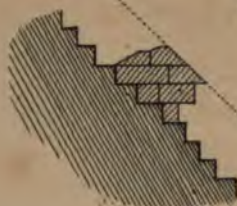
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*Masonry courses, backing stones, & casing stones
of 2nd Pyramid, near the upper part of S.E. angle.*

From Photograph.

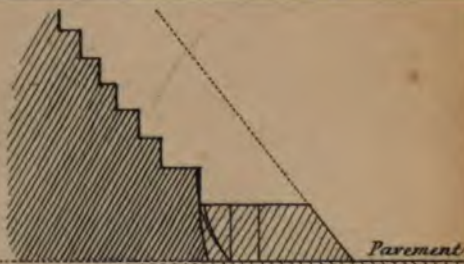
*Vertical Section
of masonry-courses
backing-stones, and
casing-stones on the
North Stone Pyramid of
Dasher. Howard Vyse &
Perring, Large Plate XIV.*



100 50 0 100 200
Scale of Inches.

*Vertical Section
of Howard Vyse's casing-
stone, backing, and the
masonry courses, at
North foot of the
Great Pyramid.*

100 50 0 100 200
Scale of Inches.



LIFE AND WORK
AT THE GREAT PYRAMID

**DURING THE MONTHS OF JANUARY, FEBRUARY,
MARCH, AND APRIL, A.D. 1865 ;**

WITH

A DISCUSSION OF THE FACTS ASCERTAINED.

BY C. PIAZZI SMYTH, F.R.SS.L. & E.

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AND ASTRONOMER-ROYAL FOR SCOTLAND.**

IN THREE VOLUMES ;

WITH ILLUSTRATIONS ON STONE AND WOOD

VOL. III.

**EDINBURGH :
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VOL. III.



DISCUSSION
OF RESULTS.

*'The fair question is, Does the newly proposed view
'remove more difficulties, require fewer assumptions, and
'present more consistency with observed facts than that
'which it seeks to supersede? If so, the philosopher will
'adopt it, and the world will follow the philosopher—after
'many days.'*

MR. PRESIDENT GROVE'S

*Opening Address at the British Association for the
Advancement of Science, at Nottingham in 1866.*

DIVISION I.
LAWS OF PHENOMENA.

*' As a first preparation, therefore, for the course he is
' about to commence, he (every student who enters upon a
' scientific pursuit) must loosen his hold on all crude and
' hastily adopted notions, and must strengthen himself, by
' something of an effort and a resolve, for the unprejudiced
' admission of any conclusion which shall appear to be sup-
' ported by careful observation and logical argument, even
' should it prove of a nature adverse to notions he may
' have previously formed for himself, or taken up, without
' examination, on the credit of others.'*

SIR J. F. W. HERSCHEL, BART.,
In Par. I. of 'Outlines of Astronomy.' 1849.

DIVISION I.—LAWS OF PHENOMENA.

INTRODUCTION.

HAVING now, in the course of Volume ii., set our numerical observations of 1865 before the reader, in all their rigorous roughness, and perhaps rather confusing multiplicity,—it is a duty to formalize their illustrations up to a certain extent ; and show, both what their own internal evidence, and external comparisons of them with other men's observations, may indicate as the proper weight to be attached to their principal results.

This department of the subject, therefore, begins with very little allusion to, and certainly no dependence on, any theory of the Pyramids. We shall curtail our aims indeed even more still, proposing to treat practically not of the Pyramids of Egypt generally, but only, of the Great Pyramid of Jeezeh ; and of that too, not by any means in its entirety, but rather as touching certain features of universally allowed, and most evident and tangible character,—wherein it differs from every other known Pyramid.

With all well understood points of *resemblance* therefore amongst Pyramids, we have nothing to do; especially when these points belong to the necessary mechanical road by which every Pyramid builder must have set out, to construct the beginning of any Pyramid whatever. Hence, how or wherewith the builders reared stone upon stone, so as to form the great bulk of the masonry, is not our present topic; for the self-same practical methods which lifted the blocks to form the courses of, say the third Pyramid of Jeezeh, would have been exactly sufficient, more time only being allotted, to lift the more numerous, but not necessarily more weighty, single blocks of the Great Pyramid into their successive places. We see plainly in the dozens of Pyramids still standing, far and near, that the stones *were* lifted, and great exertions of art or strength may have been requisite to that end; but there is nothing in the stone-upon-stone composition of the Great Pyramid, which speaks of the mere building problem to be solved there, as being of a different character, or requiring inventions by man of any absolutely higher order, than elsewhere.

In fact, the *artisan* construction of the Great Pyramid, is as nearly similar to that of all the remaining Pyramids of Jeezeh, and many others elsewhere,—as is the physical constitution of man's bodily frame, or of his bones, muscles, sinews, and blood-vessels, to the bones, muscles, sinews, and blood-vessels of most mammals on the face of the globe;

growing on the same principles of growth, and hurt or nourished by the same, or nearly similar, material agents. Some superior finish and perfection of parts there may be indeed, and actually are, about the composition of the Great Pyramid,—even as the body of man is superior in beauty and perfection to that of all animals. But, if we would look to what *most* distinguishes man, we must attend to what is present in him, and wanting in all the other denizens of earth; viz., mind, language, and soul, his schemes for education in this world, and self-denying preparation for another.

Even in the same manner,—whatever may be ultimately thought as to the degree of the thing shadowed out,—there appears to be a series of features in the Great Pyramid, which have no counterparts whatever in the other Pyramids; and excel, as well in the grandeur of their objects, as elevation of their meaning, the mere corporal existence of any ordinary Pyramid, as far as does the soul, the body of man. To these, so to speak, psychical distinctions of the Great Pyramid, therefore, we propose now to address ourselves; but our progress must be very cautious, and jealously watchful for any possibility of being led astray by imperfect knowledge,—not of what the monument is now, picturesque and grand too in its ruins,—but of what it was at the time of its building; for only in so far as we can regain that state, are we entitled to any certainty in concluding its original character, objects, or purposes.

Now, in this point of view, we cannot realize to ourselves too copiously, that the Great Pyramid has been standing amongst mankind, by the testimony of all modern authors, 3500 years at least,—some say very much more, as even 6500 years,—and we may, in the end, be able to throw some light on the question of how long exactly. It dates, therefore, even at the lowest published computation, in Biblical personal chronology, not only from before the ‘birth of history on that night when Moses led the ‘Exodus out of Egypt,’ but before Jacob, and before Abraham; long before any known literal representation of language, either Hebrew, Sanscrit, or even Egyptian; before any papyrus that has been preserved, and before any recognised examples of even pictorial representations, other than a few carved and painted stones in and about the Pyramids themselves.

What changes, then, and what mischiefs may not have occurred to the Great Pyramid, through all that enormous space of time, during which Egypt was trodden under foot by nation after nation in succeeding ages of the world; and the Great Pyramid standing all the time in the midst of a field of tombs, one of the grandest scenes of burial throughout the whole earth. For a time, indeed, the sanctity of a place of sepulchres reputed of the kings of the nation, would hedge the whole district around with intense respect, nay, even veneration; and a deposit of other things for safe keeping, besides occasional

gold and jewels, may have been made there. Of treasure, however, in the usual acceptation of the term, there has been remarkably little found at any time near the Jeezeh Pyramids, so that mere robbers for filthy lucre's sake, never received much encouragement;¹ and the first form assumed by want of respect towards the original dead, which arose with new dynasties and strange tribes dominant in the land, was merely an occupying of their expensively constructed, or laboriously excavated tombs for similar burial purposes again.² In short, the field of the Pyramids, and often the same individual

¹ Ancient Roman coins are found occasionally in some of the tombs, and we saw a handful in 1864, which had been bought the same day from an Arab near the Pyramid. Gold signet-rings of Egyptian manufacture, have likewise been met with: for, not only is there the well-known instance of the ring secured by the late Dr. Abbott, and distinguished by the oval of King Shofa; but we have been lately informed, that a very similar ring, massive and solid, but belonging to a subsequent dynasty, was found in a tomb on the eastern side of the Great Pyramid hill in 1866, and was sold from hand to hand at increasing prices, before the Museum of Boolak could step in to claim its own.

² In Hekekyan Bey's *Chronology of Siriadic Monuments*, the following instructive passage occurs at p. 20:—'But we must be on our guard not to assign the construction of a monument always to the most prominently legible names that have been engraved on it. There was a colossal statue of the first class in dimensions in Memphis, the cylinders of which had apparently, by the frequent sections sliced off from them to engrave new seals or ovals on them, been so much diminished, that a mortise was made through and through in each hand for the introduction of new cylinders. There were also standard statues in the temples, made to the size of life, with a hollow in their faces for the introduction of new noses, in order to bring about a resemblance to the king of the day. As these statues were painted and gilded, a clever artist, assisted by conventionalities respected by public opinion, could gratify the vanity of the ruling sovereign.'

vaults, continued to be used for interment over and over again, for more than two thousand years, or up to the time of the Romans; and the full rage for breaking up, ransacking, and plundering,—only really began, after the locust-like armies of the destroying Muslims had issued from their Arabian home, and established themselves in the Coptic land.

Here, then, in the Great Pyramid, are the remains of a building so old that no contemporary writing about it exists; indeed, no subsequent book-writing treats of it within 1500 years at least of its foundation,—when changes of race, religion, and sentiment innumerable had in the meantime occurred, and its real purpose been lost. And now it is so injured, by comparatively recent ravages, as to be in the eyes of some passing travellers little better than a heap of stones. What, therefore, can be undeniably made out from its relics in our day, as to an exact nature or character having ever appertained to it?

Little enough, we may fear; unless, indeed, some far surpassing skill was employed, both in devising its principles, and superintending their methods of execution. But as that is precisely what has been often, and very variously, asserted, and denied,—the question, as above proposed, is brought immediately before us, and invested with important claims for earnest, and even instant, attention. Wherefore, taking for granted that our readers at

this stage are acquainted with all the leading points in its history (so far as written), and the generally acknowledged more conspicuous features of its appearance,—we shall treat of the Great Pyramid, not as a thing just descended upon earth, and requiring a round-about induction before anything whatever is to be inferred concerning the mere existence of any part of it,—but, as something known approximately for a long time; and allowing us freely to begin, by mentioning some very simple propositions already adverted to by numerous authors, and testing how far they may be borne out by these recent, and more than usually painstaking, observations of ours: hence—

PROPOSITION I.

‘ THE BASE OF THE GREAT PYRAMID IS SQUARE ? ’

GENERALLY speaking, every one can see that the base of the Great Pyramid has four sides ; that the angles at the corners cannot be very far from right angles ; and that the sides cannot be very unequal in length : but some men have hesitated to admit any high degree of exactness in those particulars, in face of the following passage from F. Vausleb, A.D. 1664 :—

‘ I have taken notice that none of the Pyramids’
‘ (bases) are alike, or perfectly square ; but that all
‘ have two sides longer than the others. I intended
‘ to measure the greatest ; for that purpose I had
‘ with me a string of about thirty land yards ; but
‘ because the winds have heaped about it mountains
‘ of sand, I could not possibly draw a line straight
‘ from one angle to the other.’

Now, from the confidence with which this author speaks of two sides being so plainly overlong, even to casual observation,—one can hardly imagine that he would infer less difference than about 1-5th of

the whole of one side, which feature at the Great Pyramid measures about nine thousand inches in length. Yet in the early part of April 1865, when I had had three months' acquaintance with the Pyramid,—and then went over all four sides (vol. ii. p. 133) with a 500-inch cord, making the best allowance that I could for broken corners, and heaped flanks,—the difference of the least, from the greatest, measured side seemed under one hundred inches; or, 1-90th only, of the whole; in spite, too, of such evidently large errors of observation accompanying, that this result could be considered only as a first and rather distant approximation.

Yet no closer approach was probably ever made in modern times, until a few weeks afterwards,—when Mr. Inglis uncovered all four of the peculiar *corner-sockets* of the original casing-stone surface, or true exterior of the ancient Pyramid (vol. i. ch. xvii. p. 535; also Plate iv. vol. i.); found them marked sharply and immovably in the solid rock below; and the distances between them not to vary in any two cases above eighteen inches (vol. ii. p. 134), or, no more than 1-508th of the whole side! And even this could only be regarded as another step of approximation, weighted too, more probably with large errors of observation by the modern observer, than of commission by the ancient builder,—because, the ground between each socket is *now* so excessively difficult to measure over, by reason of heaps of broken stones.

The third approximation therefore fell to my share, in measuring with the Playfair altitude-azimuth instrument, the azimuth,—first, of the line of the two sockets on the eastern side, and second, of those on the northern side of the Pyramid ; for such measure was independent of the exact length of the sides, and made positive use of the heaps of rubbish in the middle of them by mounting the instrument upon their bulk, thereby enabling it to see, both the signals placed over the terminal sockets, and also the Polar star. The latter was unfortunately the only means of connecting the two sets of sockets, for each socket is in a sort of hole, and can see no other socket on account of huge intervening mounds of rubbish ; hence the observation is not by any means a *ne plus ultra* of modern measure ; yet it was more trustworthy, *à priori*, than the two former methods, and made the angle of the Great Pyramid's base at the north-east corner, to be equal to 90° ,—all but a few seconds short of $1'$ (vol. ii. p. 194). Let us say $1'$; and, to form an idea of what that signifies in the former terms ;—if that $1'$ were caused solely by the west side of the Great Pyramid being of a different length from the other three,—a variation of 2·5 inches, or only 1·3600th part of the whole length, would make all the difference of angle found.

In direct proportion then as our means of measuring the contested point have advanced in power, so has the base of the Great Pyramid been proved to

be closer and closer to a true square ; and so close at last, that there can hardly be any reasonable doubt left, as to the *intention* of the builders to have made it as perfectly square as their practical means enabled them to do. Seeing, moreover, that no better result of measure is likely to be procured, until excavations and clearings are effected round the entire Pyramid,—and in so extensive as well as complete a manner that no one at present living, whether European or Egyptian, seems disposed to be at the expense of undertaking them,—we may consider this first Proposition to have been temporarily settled in the affirmative.

PROPOSITION II.

‘ THE FOUR SIDES OF THE GREAT PYRAMID INCLINE TOWARDS ITS CENTRAL VERTICAL AXIS AT EQUAL ANGLES ? ’

Now Dr. Perry, in 1743, has written, that ‘ in the opinion of most persons the different sides of the (Great) Pyramid ascend at different angles ; that one side has an angle of 40° , another of $37^{\circ}5'$, a third of 35° , and a fourth of $42^{\circ}5'$. ’ and although Colonel Howard Vyse remarked, ‘ this may be owing to the dilapidated state of the building and to the base having been covered with sand and rubbish—for the building was *no doubt* equilateral

‘and equiangular,’—yet this does not exactly meet all the difficulties of the case. It might also be further alleged with that party, that not only he, but the French *savants* of 1799, Sir Gardner Wilkinson, and all other really first-rate authorities, have invariably thought it sufficient in their published descriptions of the Great Pyramid, to give the angle of one side only,—or rather to state one angle, even to the accuracy of a single minute of space,—as representing equally and sufficiently the inclination of every side. But then comes the question,—if they only measured one side, of what possible authority can their assertions be, as touching the other sides?

There may be more observations on the subject recorded somewhere by those eminent men, but I am not at present acquainted with them: nor was I when, in January 1865, Mr. Ayrton kindly communicated to me his own observations (given in vol. ii. Section v.) ; observations taken with a theodolite, and evidently by a man well acquainted with the principles of mathematical investigation. Now, as these observations give the angles of the different sides varying from $51^{\circ} 51'$ to $55^{\circ} 58'$, they appear to prove an immense fact of diversity actually existing in the present pile of the mere internal courses of the ancient Pyramid; an amount indeed of *error*, which the builders would have found it very difficult to restore to truth, with the limited means which the thickness of the casing-stones placed at their command. In this point of view, I conversed

on the subject with other members of the late Cairo Institute ; but they expressed the utmost confidence in Mr. Ayrton's observations, as representing a real feature in the Pyramid, and deserving most serious attention. They likewise characterized the whole casing-stone theory as a pure modern invention,—the Great Pyramid having always been, in their estimation, the 'stepped,' or 'laddered,' structure it now is.

Let us therefore first take the present Pyramid just as it stands, and test that by further observation. Before bringing any instruments to bear too, let us make ourselves acquainted with the structure which is to be observed : for, even passing over the asperities of rectangular courses of stone, forming, by their being set one within the other as they ascend, a general oblique line,—it is sensibly inexact on a larger scale, dependent on the greater weathering of the softer stone used for the middle part of every side, and the less weathering of the harder stone introduced all along the corner slopes, and over the whole summit;—a feature well brought out in some of the photographs, especially Stereograph No. 5. Hence the tendency would certainly be,—were a person on the summit of the Pyramid, and directing a theodolite along the edges of the stone courses in the middle of every side as far as he could see clearly,—to obtain too large an angle of dip ; and a very inexact one also, because it must be decided by the weathering of the stones at a distant part, where they cannot be well examined.

Now this, I am told, *was* the manner,—very creditable too, to the observer, as touching the brave exposure of himself and theodolite on the top of a dizzy, dangerous height,—in which Mr. Ayrton's observations were made; and his own angles of inclination of the *corner-lines* of the Pyramid (where there is hard stone all along), *if we compute the side inclination therefrom*, prove his mean observed angle of the *side* to be full 2° over great. His corner-line angles are also much more accordant *inter se*, varying only $30'$, against the variation of his side angles by $4^\circ 7'$. Plainly, therefore, the latter large quantity is an error due to not attending to the practical details of the nature of the thing to be observed; though it gives a gratifying proof of the perfect honesty and general ability of the observer concerned.

My own direct measures of the case were only made on April the 8th; when I had become pretty well acquainted with the accidents of the Pyramid surface. And my method was, to ascend the rubbish-heap in the middle of every side, and choose there amongst stones variously weathered, one that had suffered least, and then measure the angle from that to the summit of the Pyramid,—where I knew from previous observation, though I could not then see it, that all the stones were little worn:—and the result was, that no greater difference than $15'$ was found between any two sides (see vol. ii. p. 165).

A more powerful opportunity, however, occurred in the last week of the same month, after the corner

sockets of the original base of the Pyramid had been opened up. For, on observing with the large Playfair alt-azimuth instrument, the angle of altitude of the top of the Pyramid, as seen from the floor of each socket just inside its outer corner,—the differences were reduced to 8'; and when the floors were corrected for their various depressions below a given datum plane, the differences (see vol. ii. p. 176) were further reduced to 3'.

Now this last approximation, which comes so very close to the statement of our proposition, was obtained by employing the present Pyramid at the top, and the ancient Pyramid at the bottom, as represented by its four sockets; and as these are considered to be the sockets of its former outside casing-stones,—their theory is included, and partly confirmed by the result. But we have further testimony on that point.

Herodotus and other authors speak of the smooth surface of the sides of the Great Pyramid, evidently as formed by the bevelled outside of the casing-stones: besides which, we see portions of the casing of the second and third Pyramids still existing; and, by excavation, may find the lower part of the casing of the seventh, eighth, and ninth Pyramids still *in situ*; all these casings being on the same plan, viz., stones of fine quality, admirably worked, rectangular at the back towards the bulk of the Pyramid, and bevelled off on the outer surface to one general angle for each Pyramid.

‘That may be,’ said learned Cairenes, ‘for all those other Pyramids you have mentioned; but the Great Pyramid was different from its neighbours in that particular, for it was always the “laddered” Pyramid; and though no doubt Colonel Howard Vyse did find two bevelled stones at the northern foot, there were never more than those two!’

I have already described, however, in vol. i. ch. ix. p. 216, the finding by our party, of fragments of casing-stones innumerable, on all four sides of the Great Pyramid: and have now further to record, that when the oblique angles of fourteen of these fragments were afterwards measured carefully in Edinburgh, they gave, within twelve minutes, the same angle for each of the four sides of the monument; as close a proof to the equality of the ancient angle of the Pyramid sides, as could be expected from the small size and injured character of the specimens. And having had, further, a large theoretical model of the Pyramid recently constructed by a very exact-working carpenter,—and having had set in the sides of that model, with either their upper or lower surfaces coincident with a horizontal section of the same, all the available casing-stone specimens,—their outer bevelled surfaces were invariably found practically coincident with the theoretical slope of the model.¹ ‘I should not have been so much surprised,’ said the carpenter, speaking as a represen-

¹ This model, with its casing-stone fragments, was presented to the Royal Society, Edinburgh, in April 1866.

tative man of his order in the present advanced age of the world, and in a city noted for intellect and education, 'I should not have been so much surprised, if one or two of the stones had fitted ; but ' to find all fourteen of them fit ; and fit as exactly ' as if they had been made to my own work, that ' does surprise me !'

After this rude though thoroughly practical illustration, it will probably be allowed,—that in its original perfect state, the Great Pyramid must have been a remarkably close approach to the regular figure demanded in our present Proposition.

PROPOSITION III.

' THE ANGLE OF INCLINATION OF THE SIDES OF THE
GREAT PYRAMID IS $51^{\circ} 51' 14.3''$?'

THE two former propositions merely went to ascertain whether the Great Pyramid could be considered as a regular structure, or indeed as a mathematical Pyramid at all—a quality which may or may not belong to any of the other so-called Pyramids around ; and is generic only, in its widest sense. But the present proposition is far more particular ; for, while from the same base there may be raised, by altering the angle of the sides, an infinite number of regular, though different, Pyramids ; it is here asserted that the angle of the sides of the

Great Pyramid is of precisely such an amount, as to cause the linear proportion which the vertical height of the whole mass, bears to twice the length of one side of the base,—to be precisely that of the diameter, to the circumference, of a circle; the invaluable quantity π of all modern mathematics.

This view of the matter is owing certainly and solely to the late John Taylor. He derived it originally from the measures published by Colonel Howard Vyse, giving the angle of his two celebrated casing-stones *in situ* at the northern foot of the Pyramid, as being between $51^{\circ} 50'$ and $51^{\circ} 52' 15''$. This result was by two different methods of measurement, but the latter slightly better than the former, so as to raise the mean rather above $51^{\circ} 51' 8''$: and he, John Taylor, held to his views therefrom, notwithstanding that a host of diverse mathematical theorems were advanced by other investigators, as having probably regulated the proportions of the Great Pyramid. Notwithstanding also that Colonel Howard Vyse's friend and assistant in Egypt, Mr. Perring, subsequently fell away from his own original measures; and, having lost by death the Colonel's friendly and honest guidance, committed the fatal mistake,—applauded though it was by Chevalier Bunsen,—of remodelling all the measured proportions of the Pyramid, according to a pure hypothesis as to even numbers of the Egyptian cubit having been employed on the principal lines. Whence resulted the angle $51^{\circ} 20' 25''$, for the incli-

nation of the sides of the Great Pyramid ; a quantity which has therefore been boldly, even brazenly, printed as being the actual fact, in the second volume of Bunsen's *Egypt's Place in Universal History*.¹

Now, if the question had rested still, where Colonel Howard Vyse left it, I would not have presumed to interfere. For although my angle-measuring instruments were superior to his,—there is not now any feature accessible about any part of the Pyramid, which can approach in the remotest degree to the admirable facilities for correct measure which his large casing-stones *in situ* afforded,—or which can pretend to bring the question within the very small range of uncertainty, which his two perfectly independent methods of measuring the same thing, ultimately resulted in.² But when some one else in London, subsequently alters the quantity at will, by more than half a degree,—I have then no compunction in bringing out whatever I may have actually observed in Egypt; and in thereby allowing all men

¹ As an illustration both of the persuasions to which Mr. Perring may have succumbed, and of some men being still sadly prone to put theory, not only before, but in place of, measure,—I may mention having received a letter from an octogenarian in October 1866, suggesting that I should *proportion all my own measures to his theoretical lengths of coffin and Pyramid* ; for though these latter hypothetical numbers are often very wide of the actual quantities, their author thinks they illustrate 'eternal laws,' and 'absolute harmonies ;' and are therefore infinitely superior to anything that can be derived from direct measures. He likewise advises that the present book should be illustrated, not with drawings of the Pyramid itself, but with photographs of a large diagram representing his theoretical idea of the Pyramid !

² See *Our Inheritance in the Great Pyramid*, by the Author, pp. 21 to 24.

to see for themselves, whether there is any probability of $51^{\circ} 20'$ being nearer to the fact of the Great Pyramid, than $51^{\circ} 51'$; for the odd seconds are not worth noting in the presence of more than half a degree of defalcation.

First, then, I would remark, referring to page 165 of volume second,—that my measures of the mere denuded sides of the Great Pyramid, taken with special pains to avoid effects of weathering, are, on every flank of the Pyramid, contained within the numbers $51^{\circ} 39'$ and $51^{\circ} 59'$. And, second, that the fragments of all the casing-stones measured, come (vol. ii. p. 169) in the means of two sets arranged according to their having been derived from the upper or lower edge of the casing-stones,—between $51^{\circ} 49'$ and $51^{\circ} 58'$.

But whereas those two examples may be considered of very limited powers, I would allude, thirdly, to the observations taken with the Playfair altitude-azimuth instrument from the four corner sockets of the Pyramid. There, at least for the lower parts, we had the very original terminal markings of the Pyramid's base; and if for the summit we had only the *denuded* top of the Pyramid, we may have some means of approximating to the *thickness* of casing to be virtually supplied. In fact, on this point the whole question turns; we shall do well, therefore, to inquire into its structural details before referring to instrumental observations.

Now, only by examination of the Pyramids them-

selves, can we expect to become acquainted with their builders' mode of applying their peculiar system of a casing-stone finish to the exterior ; and there are some points about it, which have not yet been brought out in print. On looking to the third Pyramid of Jeezeh, we see many of its casing-stones still *in situ* at various heights, simply seated in the angles of the component courses of masonry ; and if that were the rule also at the Great Pyramid, the average thickness of the casing must always have been measured by one stone. But, if we examine, on the other hand, the second Pyramid of Jeezeh,—it is found to have one, or more, thicknesses of a sort of intermediate class of *backing-stones*, between the rude courses of masonry and the exquisitely bevelled exterior of the outer casing ; the horizontal thickness, consequently, of what must be considered *there*, the general casing, is measured by several stones, and is much greater than at the third Pyramid.

Which of these two plans, then, was probably adopted at the Great Pyramid ?

Without doubt that of the second Pyramid : for there, all the casing still visible about the upper part, is of the white Mokattam limestone, such as all the fragments at the foot of the Great Pyramid are composed of ; and those two are nearly contemporaneous buildings (see chapter x., vol. i.) ; while the third Pyramid is an erection of a long subsequent age, and its casing is in red granite, a rare and costly material in Lower and Middle Egypt.

Let us attend then to what are the facts at the second Pyramid ; where, after having first noticed certain phenomena from the ground below it, with the eye,—I was subsequently enabled to obtain an approximate measure of them by placing several photographs, then and there taken, under a microscope provided with a micrometer ; and the following are the nearly consistent results derived from views of both the north, east, and south sides, but more particularly from the southern end of the east side, close to the lower termination of the casing there—

Height of each of the regular courses of masonry forming the core of the upper part of the building,	= 37 inches.
Height of each of the stones forming the external surface of the casing,	= 19 "
Height of each of the stones forming one or more layers <i>between</i> the regular internal courses of masonry and the outside bevelled casing-stones,	= 20 "
Horizontal distance from the outside bevelled surface of the casing-stones, to the regular courses of internal masonry core, including, therefore, all the interstitial layers of backing-stones of 20',	= 105 "
<i>See Frontispiece.</i> ¹	

¹ As a further illustration of the large amount of horizontal projection of the casing-stones beyond the courses of the second Pyramid,—I may mention that our Arab attendant, Alee Dobree, being freed from our service on a Sunday, employed his leisure on one occasion in company with some of his friends, in conducting an eager traveller, name unknown, up the second Pyramid. They progressed well enough for half the ascent ; but when they came close under the casing, and saw it spread out over their heads like an umbrella,—the traveller became so nervously alarmed, that Alee and the Arabs had to bind him to them, they said, with ropes, or he would have fallen down like a stone ; and there was an end at once to all his ambitious projects, at the second Pyramid.

In Howard Vyse and Perring's folio views the horizontal distance of

Now, inasmuch as these numbers show, that the casing-stones were generally small as compared with the blocks forming the courses of masonry, and were accompanied by other small stones, also of fine quality behind them, and cut rectangularly,—we see immediately why the casing of a Pyramid, cased on such a plan, was so great a prize to the Muslim plunderers of the middle ages, who were in need of building materials for their newly-devised cities. For, such moderate-sized rectangular stones, of the white Mokattam order, are precisely what the Arabs about the Pyramids are still plundering the tombs of,—whenever their internal walls are so composed; and at the Great Pyramid, the supply of such stones could only be got at by pulling off the bevelled casing. While, if this itself was likewise composed for the most part of stones only twenty inches high,—they could be trimmed into shape with far greater ease, than such very large blocks as all the casing-stones have been usually supposed to be, from the enormous size of Colonel Howard Vyse's celebrated two. These, however, formed part of the very base of the casing, and had a particular mechanical reason for being massive, which did not likewise appertain to the majority above them.

the outside casing from the inside courses, is about ninety-six inches, close under the casing; but rather more a few courses lower down. The datum for linear measures of details in my photographs already alluded to, I should add, has been the breadth of the second Pyramid, from point to point of its casing's lower end, as given in the meridian section of the same folio views, and made equal to two thousand two hundred inches.

To infer again what the arrangement of the upper part of the casing of the Great Pyramid must have been, from another example than that of the second Pyramid,—we may allude to Colonel Howard Vyse's description of the north Pyramid of Dashoor, the architecture of which he frequently compares to that of the Great Pyramid; besides its being, in point of size of base, the nearest approach to that grand example, of all the Pyramids of Egypt. This Dashoor monument, then, was built of a local reddish stone, full of petrified shells, but was cased with white Mokattam stone. Some patches of this casing still exist *in situ*, at various heights of the Pyramid's sides; and one of them, represented on Plate I., shows unequivocally the backing, or filling-in, with rectangular blocks of white Mokattam material, between the bevelled casing-stones and the regular courses of constructive masonry of the Pyramid's core. There is no scale to the Colonel's or Mr. Perring's view (Plate 14 of his folio views); but, measured by his stated breadth of the entrance passage which is close by,—the mean horizontal thickness of the white casing and backing stones represented, is rather more than 120 inches. In other parts of the Pyramid the same feature varies from 60 to 130 inches,—the figure given by the mere masonry courses being very rude, and requiring much larger corrections in some places than in others.¹

¹ The following further account of this Dashoor Pyramid is important. 'The top of the Pyramid was built entirely with Arabian

Now comes the all-important question, viz., what thickness shall we assign to the casing that once surrounded the *present* summit of the Great Pyramid; which so-called summit, let it always be borne in mind, must have been some 350 inches below the original culminating point? Colonel Howard Vyse gives for the distance of the outside of *his* two casing-stones, from the Pyramid courses, on their level, 'about nine feet,' or 108 inches; and in his view, he fills part of that space with certain filling-in blocks, as also shown on our Plate I. fig. 3. But if we take for the summit casing's horizontal thickness in the middle of one of the sides, the round number of 100 inches,—and add one inch for the thick layer of red mortar between the outside of the masonry course and the first surface of the backing-stones,—similarly with what may be seen outside the present north-eastern corner of the Pyramid near the ground (stereographic photograph No. 1),—we then have a *side* thickness which gives a diagonal measure at the *corner*, of 143 inches. And, from our actual measure, at the socket below with the Playfair altitude-azimuth instrument, of signals held out at the top of the Pyramid to dis-

* (Mokattam) stone. The apex had been formed of one block, and the 'course below it of four others, 57 inches thick; but in general the 'courses towards the top were about 24 inches, and those near the 'base 36 inches in thickness. The stones are laid in horizontal 'courses, and the whole of the masonry is good, and resembles that of 'the Great Pyramid of Jeezeh.'

'Being still very sharp at top, it is called by the Arabs "Haram 'Mesinee," the pointed or sharp Pyramid. It is also called "Haram 'el Wataweet," from the number of bats within it.'

tances of both 100 and 150 inches in the diagonal direction,—we are justified in stating (see vol. ii. p. 176), that the 143-inch diagonal would have an altitude at every corner, between $41^{\circ} 58'$, and $42^{\circ} 1'$; while the theoretical corner angle arising from John Taylor's side angle of $51^{\circ} 51' 14.3''$, is $41^{\circ} 59' 48.7''$.

This example may perhaps suffice to show, that Colonel Howard Vyse's measured, and John Taylor's adopted, angle of the side inclination of the Great Pyramid, cannot be very far from the truth. But there is even a fourth reference which may be made to observation; and if the things referred to therein do not appear at first sight, to be in any immediate way connected with the matter, and never have been so connected yet by any author or traveller,—they will speak for themselves when they come to be *measured*. Most happily too, every part of them which has to enter into the measurement, still exists visibly and tangibly; so that good, painstaking, modern observation is perfectly able of itself, either to prove or disprove what has just been advanced.

The features here alluded to, are the azimuth trenches, as we have termed them (vol. i. p. 134 and 416; and vol. ii. p. 125 and 185; see also Plate xv. vol. ii.), before the Eastern face of the Great Pyramid; features which are unique, and have nothing at all resembling them, about any other of the Pyramids of Jeezeh. The earliest distinct notice which I have been able to identify as alluding to them, is

that of Dr. Richardson in 1817; and he, travelling in the train of a peer of the realm, and at a time when the trenches were half filled with rubbish, speaks of them as resembling the inclined roads by which a gentleman's carriage would be taken to and from a pond of water. He then speculates upon whether they might not really have had something to do with moisture in a more important manner,—imagining that the water of the Nile was raised up in ancient days by bucket-wheels innumerable to the top of the hill, and then poured into the trenches; which, if cleared of their present anomalous contents, might be found, he suggests, to descend very deep, and convey their fluid supplies to the concealed tomb of King Cheops, keeping that structure thereby perpetually surrounded with water, in the island-like manner detailed by Herodotus.

Subsequently, M. Caviglia in 1820, and Mr. Perring in 1837, did clear out most of the loose rubbish; and thereby showed the untenability, either of the carriage-road or the water-trough hypotheses:—in their place, however, announcing the idea, that the trenches had been used *for mixing mortar in at the time of building the Pyramid*; an idea repeated by Sir Gardner Wilkinson, though without particular affirmation. Dr. Lepsius again looked on at the same hollows in 1843, pronouncing them, according to his map, *to be tombs*. And finally, the moment I caught sight of them in January

1865, they gave me the impression of being somehow or other connected with an original laying out of the dominant angles of the Great Pyramid,—in the manner of an astronomer's marking the meridian and prime vertical lines with much exactitude, before beginning to build a public observatory.

Two of the trenches, the north and south ones, evidently indicate a meridian line, or rather a parallel to the east face of the Great Pyramid. And then a very peculiar, sharply, and deeply cut trench,—the east-north-east one,—goes off from the middle of the linear distance between them (Plate xv. vol. ii.), at an angle, measured accurately with the Playfair instrument, of $76^{\circ} 25' 52''$ with the line of the north and south trenches; and of $76^{\circ} 11' 22''$ with the line of the two sockets at the north-east and south-east corners of the Pyramid's base. The mean of these two quantities, being $76^{\circ} 18' 38''$,—while the angle at the summit of the Pyramid between opposite faces, according to John Taylor's theory, is $76^{\circ} 17' 31''$.

Again, from the same starting-point, the angle between the north-north-east and east-north-east trenches, is $51^{\circ} 53' 22''$; evidently a near approach to John Taylor's number for the angle of elevation at the foot of the Great Pyramid in the middle of one of its sides. But as this angle can be deduced trigonometrically from the angle at the summit of the Pyramid, of which we have the two distinct trench measures above given,—there can be produced

from the azimuth trenches three determinations for the angle of the foot of the Pyramid, as thus—

1.	.	.	.	.	.	.	51° 53' 22"
2.	.	.	.	.	.	.	51 47 4
and 3.	.	.	.	.	.	.	51 54 19
The mean of all which, is							<u>51 51 35</u>

an astonishingly close approximation surely to John Taylor's $51^{\circ} 51' 14.3''$: and utterly removed from Mr. Perring's and Chevalier Bunsen's hypothetical quantity of $51^{\circ} 20'$.

True, no doubt, that these trench results may be termed 'only a coincidence;' but then what a coincidence, compared to any other that could be instituted in all that region, even amongst forms more apparently similar! Look round, for instance, at all the rest of the Jeezeh Pyramids, some of them indicated historically to be built in imitation of the Great Pyramid,—but by kings or architects who were of a diametrically opposed religious belief; and who evidently, by the fact of the measured proportions of their works, did not appreciate the invaluable geometrical consequence of the particular angle $51^{\circ} 51' 14.3''$. For thus are given those Pyramids' angles by modern independent observation—

		{ $52^{\circ} 50'$ by the French <i>savants</i> .	
Second Pyramid,		{ 52 20 by Howard Vyse.	
		{ 52 50 by C. Piazza Smyth.	
Third Pyramid,		51 0 by Howard Vyse.	
Fifth,	"	52 15	"
Seventh	"	52 10	"
Eighth	"	52 10	"
Ninth	"	52 10	"

That is to say, each and every one of these Pyramids is largely removed,—or, by a great many times the value of the azimuth-trench angular differences,—from the typical angle of the Great Pyramid! But, while pointing out this remarkable feature as a crying fact, I am at the same time quite ready to bow before a civil engineer like Mr. Perring, in a matter of building,—and allow, that the trenches were used, and probably opened out and widened along their axes at the time of the building of the Great Pyramid,—for '*mixing mortar*' in. Or, to be equally respectful before Dr. Lepsius, as a sepulchral authority,—and consent to the trenches having been used, after the building was over, and mortar-mixing no longer required,—for *the interment of corpses*; (indeed, our own people, in clearing out rubbish from the southern end of the north trench, turned out several lumps of bitumen, and a few mummy rags). But these employments can by no means explain, and have not even attempted to explain, the particular, nay, the more than particular, *angles* at which the axes of the trenches are azimuthally situated with respect to each other; and the placing of them *at those angles*, must have *preceded* their employment for the other more material and subsequently useful purposes alleged.

Either, then, the trenches were placed by their original diggers at the actual angles now ascertained, intentionally, or not intentionally. If the former, those men, who must also be looked on as the

builders of the Great Pyramid, knew what a remarkable property they could give to a Pyramid, by constructing its slope at the critical angle of $51^{\circ} 51'$ nearly, and we shall do wisely to attend with care to their other angular works. But if the latter, that is, if the angle was the result of pure accident, without the will or intention of the builders being exerted to any extent,—and if we find, on investigating further, that the Great Pyramid is full of similar accidents,—each of them dovetailing into the other, and forming a regular system with a set purpose and grand design,—then what some men call accident, others will be inclined to look on as Providence ‘overruling the works of men, and ‘causing them to assist in bringing out results ‘which they never anticipated.’

For the present, however, we merely request attention to the features of this one case on its own merits; for there, no *subsequent* use which the trenches may have been put to, during the last four thousand years, has prevented an *original* feature of them being recovered by modern scientific measure; and when it is so recovered, it is found eminently corroborative of John Taylor’s peculiar angle, while it lends additional force to the truth and reality of this, our third Proposition.

PROPOSITION IV.

‘ THE ANGLE OF INCLINATION OF THE INCLINED PASSAGES IN THE GREAT PYRAMID, IS $26^{\circ} 18' 10''$, NEARLY ?’

IN so far as the Great Pyramid has a descending entrance passage leading to a subterranean chamber, it is like every other Pyramid at Jeezeh ; but from a certain part of that entrance passage, defined on the floor by a device of the builders which our linear measures discovered (vol. i. p. 154, and vol. ii. p. 15), there branches off the system of *ascending* passages, known now by name of the first ascending passage, and the Grand Gallery ; and these, as they exist in the Great Pyramid, are quite unique throughout all known Pyramid architecture. Considering, then, the descending entrance passage, from its mouth to the sign on the floor, a necessary means of approach to the other two passages, both of them ascending,—we have three passages peculiar to, or at least connected with, the typical part of the Great Pyramid ; and of which passages we require to know the angle of inclination. While we may well be urged to a more studious examination of the subject, on recognising in the walls of these passages the very surfaces, still existing, that were formed by the handiwork and intentions of the original builders.

Generally speaking, all modern travellers have

at once pronounced the amount of angle of the ascending passages above a horizontal level, to be equal to that of the descending passage below the same ; though some have stated sensible differences amongst them, and have given angles for one or all varying anywhere between 25° and 27° . For, as to 30° and 60° of some earlier authors, they must be attributed to the effect on their nerves of the darkness, and their 'terroure of descending the slope,' the *facilis descensus Averni*, as they thought it, rather than as the result of their applying any instrumental clinometer, however rude.

The angle, on the other hand, contained in our proposition, is a very simple deduction (which occurred to me in 1864), from a consideration of Mr. Taylor's figure of the Pyramid already given ; and is to be further explained in our next Proposition, as well as in Plate II. Being therefore founded in its birth upon the proved and measured proportions of the whole Pyramid,—the passages' angular quantity hence asserted, may be fairly allowed the honour of standing the ordeal of a trial, upon its merits ; though no further opinion can be declared, until the result of such trial becomes known. We shall, therefore, at once take each of the three passages in succession, and examine it rigorously by itself.

First, of the entrance passage. When the modern approved measures of this feature were handed me in Cairo, before going out to the Pyramid, as standing,—

' Angle by Colonel Howard Vyse, = $26^{\circ} 41' 0''$

' And angle by Mr. Ayrton, ' = $26^{\circ} 40' 18''$

each of these angles being measured by a theodolite at the upper end, observing a lamp at the lower end of the passage,—I expected the theory would be found inapplicable ; but proceeded to make measures notwithstanding. Now, although my observations went no further down the passage, than the fiducial mark on the floor already described,—that ought not to have made any sensible difference in the angle ; because those who have been down further, describe the passage as perfectly straight throughout its chief length. Yet, a very great difference was found between the former results, and mine ; indeed, so constant, abiding, and decided a difference, that in no part fifty inches long, of the one thousand inches in length that I examined, was there a single case,—even when the particular angle there was swelled by error of observation, and dilapidations of the building,—of the numbers reaching so high as $26^{\circ} 40'$; and the means of three perfectly different modes of observing, with different instruments, and at different times (vol. ii. p. 145), united in giving the angle as $26^{\circ} 27'$, without a chance of an error so large as $2'$.

Second, of the first ascending passage. This passage angle is too generally *assumed* by travellers to be necessarily the same as that of, either the Grand Gallery, or, the entrance passage reversed ; and the only distinct statement that I can find of its having

been really measured by a competent observer, is Colonel Howard Vyse's, where it is given as $26^{\circ} 18'$. My double series of observations, however, with one instrument observing from below to above; and with another, long after in point of time, from above to below (vol. ii. p. 151), combined inexorably in giving $26^{\circ} 6'$,—certainly true within $2'$.

These two small passages, then, which we have now examined,—give, one of them more, and the other less, than the theoretical quantity: their mean, or $26^{\circ} 16' 30''$, being within $2'$ distance therefrom; and looking like a case of probable error of construction on the part of honest workmen, who knew the right theoretical angle, and wished to hit, but had practical difficulty in hitting, it exactly.

Yet if this be the fact, then we are entitled to expect that, in the Grand Gallery, the angle is much more closely approximated to; for the result of our months of measuring inside the Pyramid was eminently to show, that the builders had ever risen in accuracy of work, conformably to the architectural or theoretical importance of the part they were working upon; and the Grand Gallery, from its superior length, as well as vastly superior height and finish, must be considered far to outweigh both of the little passages by which it is approached. With extraordinary anxiety, therefore, to be accurate in my measures, did I begin the testing of the Grand Gallery, and in utter uncertainty how the affair

would end ; for if, on one hand, Colonel Howard Vyse has stated the angle of the Gallery as $26^{\circ} 18'$, on the other, his angles of the two previous passages had proved erroneous by many minutes ; and Mr. Ayrton had since made the following observations on the Grand Gallery :—

‘ Angle of Grand Gallery by measurement of a	
‘ base and perpendicular,	= $25^{\circ} 17' 36''$
‘ The same, by hypotenuse and perpendicular, ’	= $25 \quad 42 \quad 53$
The same, as recorded by M. Jomard,	= $25 \quad 55 \quad 30$
The same, by Mr. Edward Lane,	= $26 \quad 30 \quad 0$

I attacked the Grand Gallery, then, with three different instrumental methods, (vol. ii. p. 155), measuring it both optically from end to end, and mechanically along every step of both sides. And as the work progressed, and even more now, I am perfectly confounded to think, how the excellent observers above mentioned could possibly have obtained the quantities set down against their names ; for no angles beginning with 25° , ever entered even into any single observation of mine, not even the most discordant ; and all the sets joined in pointing with admirable unanimity to $26^{\circ} 17' 37''$, as the true mean quantity, certainly correct within the limits of $1'$. While if, from original error of construction, the angle in some limited portions of the run of the Gallery varied from $26^{\circ} 2'$ to $26^{\circ} 35'$,—that was only towards the middle of the whole length, where a little undulation was not of so much importance as at either end ; and there, it was most instructive to see how closely the mean angle had

been preserved, equally too, on both sides of the room. (See vol. ii. p. 158.)

The undoubted result, then, of the most severe measurement by the most powerful angular measuring instruments ever brought into the Pyramid,—for such the Coventry clinometer and Playfair altitude-azimuth may fairly be considered,—has been to show an error from the theory of less than 1'. In fact, we may say, practically to prove the theory,—in a case where modern observers had differed from each other in their observations of the same thing by at least 70' (minutes).

This allusion is made in no critical spirit, but rather with the useful object of drawing a few much-needed conclusions for the regulation of our Pyramid theorizing. Some men, ardent for mathematical accuracy, may refuse to consider our proposition proved by observation, unless the latter has brought out the same second, or fraction of a second, that can be computed theoretically ; but these gentlemen must be reminded, that the Pyramid, even though the plan of it should have been drawn up by an angel with absolute perfection, was realized only by the hands of mortal men of the handicraft trade of masons, whose powers of accuracy were, and are, limited. And, if modern philosophers have considered that they have identified the same part of the Pyramid, by their observations of angle differing from each other by 70',—is it too much to concede to the ancient masons, in their far more difficult

process of *constructing* the long slope of stone, that they considered their whole Grand Gallery angle, when within 1' of the theoretical angle, to mean the same thing as that?

But in the Grand Gallery they put out all their possible powers; and were far closer there, than in the two small passages, where the errors are + 9', and - 12'. Let us then in future limit our ideas at the Pyramid of a practical angular proof of theory, when in an unimportant part of the structure to something that comes within 15'; and in an important part, to within 2', of what can be computed.

PROPOSITION V.

'THE GREAT PYRAMID IS SENSIBLY IN THE LATITUDE
OF 30°?'

THERE are not many authorities to examine for the latitude of the Great Pyramid, and by reason probably—that few persons having hitherto considered any very precise angular distance from the equator, to be *a priori* necessary for the import of the monument—men had not that peculiar stimulus to observation in universal science, of comparing fact with theory, and ancient performance against modern measure. A still further development, however, of John Taylor's original idea to that

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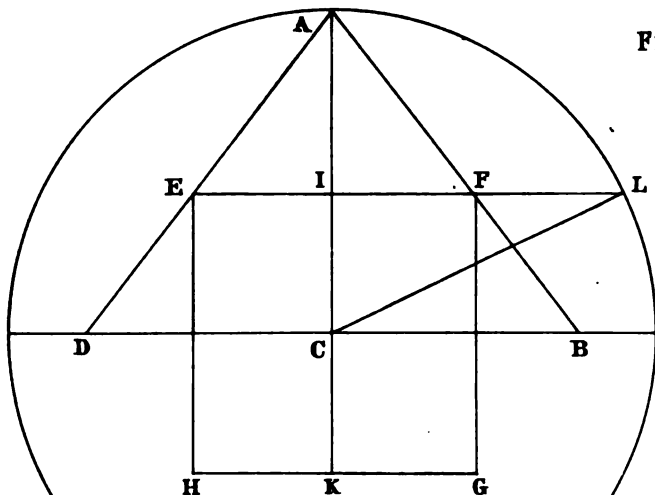


FIG 1.

Given ABD = Section of Great Pyramid according to John Taylor.
 (i.e. $AC :: DB :: \text{radius} : \text{circumference of circle}$.)
 & $EF^2 = AC \times BC$,
 then angle $BCI = \text{angle } CLI = 26^\circ 18' 10''$.

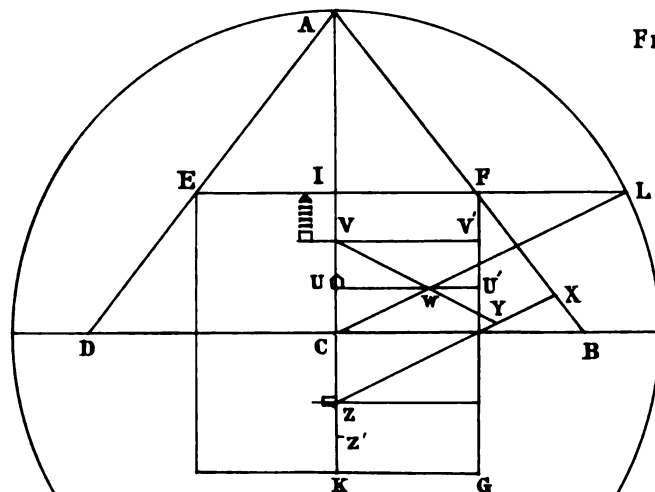
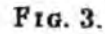


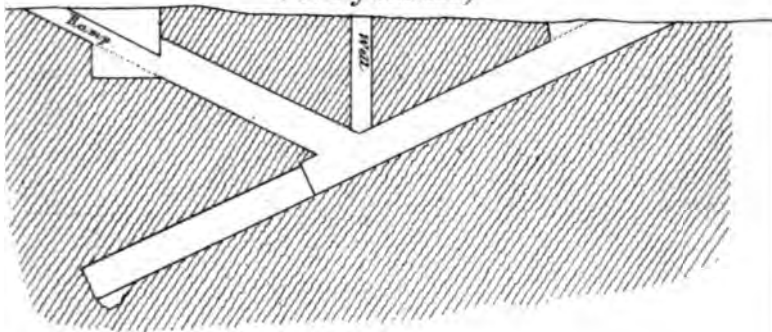
FIG. 2.

Given Fig. 1, also IC bisected by lines parallel to IF , in V & U ,
 & CK similarly bisected, in Z ,
 then XYZ , parallel to CL , = entrance Passage, with angle of incl. = $26^\circ 18'$
 YW , = 1st Ascending Passage, with angle of incl. = $26^\circ 18'$
 & WV , = Grand Gallery, with angle incl. = $26^\circ 18'$.

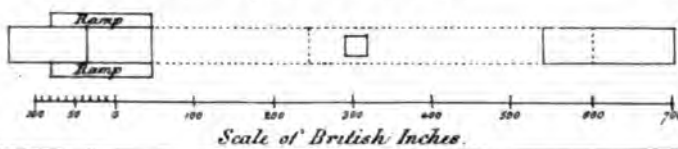


given Fig. 2, also CN drawn through V, & CM through P, where
 $CP = EF$, -
 then angle $BCL = 26^{\circ} 18' 10''$ = Lower culmination of a Pole star
 — $BCM = 30^{\circ} 0' 0''$ = Latitude of Pyramid.
 — $BCN = 33^{\circ} 41' 24''$ = Upper culmination of same Pole-star
 and WW' = height of Grand Gallery, - nearly.

FIG. 4.



with *Ground plan of the above.* *North.*



described in our last Proposition, induced me, before visiting Egypt,—to think that a latitude of 30° was necessary to complete the fulness and appropriateness of the Pyramid's geometric symbolizations. Such an angle certainly came out from a very simple treatment of John Taylor's proportions of the Pyramid, and may be described thus :—(In Plate II. fig. 1) the triangle ABD represents a section of the Great Pyramid through its vertical axis, and the middle of opposite sides ; and the proportions are, according to the above venerable authority, such,—that AC , the vertical height, is to $4 BD$ (or to four times the length of one side of the base),—as the radius, to the circumference of a circle. On that assumption, any one can compute the angle and find—

Angle at either foot,	=	$51^\circ 51' 14.3''$
And angle at summit,	=	$76^\circ 17' 31.4''$

The linear *proportions*—for as yet we do not say anything about *absolute lengths*—may of course be computed from the same data. And having in that manner obtained a theoretical area of the given vertical section of the Pyramid,—a square of equal area, $EFGH$ is formed and placed centrically and symmetrically, as in the figure ; where, by continuing the line EF to the circumference of the circle and parallel with BD , and by joining CL ,—we obtain in the angle CLI , or its equivalent BCL , a new quantity, and by computation $= 26^\circ 18' 10''$.

Now, in the first place, this angle is peculiar to a Pyramid of John Taylor's characteristics ; for if there

should be one higher in proportion to the breadth of its base, the above angle would be smaller, and if lower, it would be greater : and, in the second place, this angle, as confined to $26^{\circ} 18'$ nearly, has been made much practical use of by the builders of the Great Pyramid,—who, as shown in Proposition IV.,—appear to have regulated all three of the inclined passages upon it. Accordingly, without altering anything in fig. 1, if we merely add thereto the additional lines in fig. 2,—viz., trisection of the upper half and bisection of the lower half of the centrally disposed square, by lines parallel with the base of the Pyramid,—we obtain, first, a point z ; from which, if we draw a line parallel to the former CL , we obtain one xyz , which lies almost as exactly as it can be measured (see Pl. III. vol. i.) in the very peculiar position of the entrance passage of the Great Pyramid.

In the next place, if from v downward we draw a line at an equal but opposite angle to the CLI of fig. 1,—we obtain a line vwz , which occupies the position in the Pyramid of both Grand Gallery and first ascending passage ; while from the intersection point w , we have the line wu already formed, and representing closely the horizontal passage leading to the Queen's chamber.

This is surely a large amount of confirmation from the actual building ; and if confined as yet to mere mechanical geometry, there follow some tests derived from astronomy,—seeing that the entrance passage has been claimed by various authors, as a

tube pointed to the lower culmination of a star which was Polar at the period of the Pyramid's construction.¹ Agreeably with this idea, our fig. 3 shows, that by drawing one line from *c* through *v'*, already given, and another also from *c* through *p*, (where $CP = EF$), we obtain together with the line *cL*, three lines, *cL*, *cM*, and *cN*; of which, if *cL* be really the direction of a circumpolar star at its lower culmination, *cN* is its direction at the upper culmination, *cM* being the place of the Pole, within limits of a few seconds only; the computed values being—

<i>BCL</i>,	.	.	.	.	.	=	26° 18' 10"
<i>BCM</i>,	.	.	.	.	.	=	30 0 0
and <i>BCN</i>,	.	.	.	.	.	=	33 41 24

Now these are angles which, under the same mode of treatment, would be yielded by no other shape of triangle than that arising from John Taylor's proportions of the Great Pyramid; and they appear remarkably confirmed by the masonry of that building, inasmuch as they seem to regulate the excessively increased height of the Grand Gallery, over the original small height of one of the ordinary passages, as shown more particularly in Plate VI. But a more serious test will consist in ascertaining, whether the angle of latitude in which the Pyramid stands, is *really* the angle pointed to in the diagram by *BCM*; for if it is, the concurrence of the geometry, geography, and astronomy, of the Great Pyramid will be remarkable to a degree past all mere chance

¹ See Sir John Herschel's letter in Colonel Howard Vyse's *Operations at the Great Pyramid of Gizeh*, vol. ii. pp. 107-109.

coincidence; and a striking reason will then be obtained for the monument standing in its present parallel, and no other.

The first point to be tested in this astronomical department of the general question, is one which has been usually *taken for granted*, by all those authors who have claimed the entrance passage for a polar star; viz., that the Pyramid must have been correctly oriented, or placed with its several faces accurately to the north, south, east, and west points of the horizon. Yet the only instrumental observations on the subject, were those by the French *savants*, and they had shown an error, = $19' 58''$ of arc.¹

That quantity, however, being overlooked by all theorizers,—showed very plainly, that they did not think it capable of vitiating their astronomical deductions: and it is not a *much* greater error, than

¹ * La Pyramide est orientée avec exactitude. M. Nouet, astronome, a trouvé, par des opérations géométriques et astronomiques (Voyez *Décade Egyptienne*, t. iii. p. 105, et suiv.), que la côté du Nord déviait de la ligne Est et Ouest de $0^{\circ} 19' 58''$ vers le sud, d'où il a conclu que la ligne méridienne qui fut tracée pour orienter le monument, déclinait de $20'$ vers l'Ouest: mais, comme le revêtement a disparu, il n'est pas certain que cette petite différence provienne de la direction primitive des faces, et il est naturel de l'attribuer, au moins en partie, à la difficulté de déterminer avec une précision parfaite la direction des degrés qui bornent aujourd'hui les faces. On sait que l'orientation de l'observatoire de Tycho Brahé a été trouvée à Uranibourg, par l'Académicien Picard, en défaut de $18'$.

* D'ailleurs, suivant la remarque même de l'observateur, la ligne méridienne étant tracée et dirigée exactement au nord, on aurait eu de la peine, en élevant ici une perpendiculaire, de ne pas dévier, sur une longueur de 113 mètres $\frac{1}{4}$, de trois décimètres, quantité suffisante pour donner $20'$ de différence. Il aurait fallu, selon moi, observer

what was permitted in the most celebrated European observatory of two hundred and thirty years previous. But when the Great Pyramid, of nearly twenty times as many years earlier, came recently to be examined by us, with due attention to its fiducial markings (vol. ii. p. 196), behold its utmost error, not the $19' 58''$ alleged, nor even the $18'$ of Tycho Brahe, but only $4' 35''$!

Hence, we may now go forward with renewed confidence to the next point, and consider the *latitude* of the Great Pyramid. The result of M. Nouet's observations in the celebrated national French work, is set down as $29^{\circ} 59' 6''$; and my recent result with the Playfair altitude-azimuth instrument is, $29^{\circ} 58' 51''$; accurate probably to within $3''$. Nevertheless, if M. Nouet's original observations can be found, or shown to have been as extensive as mine,—I shall not be disposed to quarrel with any one who prefers taking a mean of the two results, to either one by itself; though

* quelle direction a le plan du premier canal de la Pyramide, celui qui
 * aboutit à l'entrée dont j'ai parlé plus haut: l'opération aurait été
 * difficile sans doute; mais le parallélisme exact et l'entière conserva-
 * tion de ses faces auraient procuré une ligne presque mathématique à
 * comparer au méridien du lieu. Nous connaissons l'angle du plan
 * formé par le fond de ce canal avec l'horizon, et cette notion fournit
 * déjà des remarques intéressantes; elles le deviendront davantage
 * encore, quand on connaîtra parfaitement, si elle existe, l'inclinaison
 * de son plan vertical sur le plan du méridien: ce travail, qui importe-
 * rait à l'histoire de l'astronomie, ne serait que la continuation des
 * recherches que l'Académie Royale des Sciences ordonna dans le
 * xviii^e siècle dans la vue de comparer les observations de cette espèce
 * chez les différens peuples.—M. Jomard, in *Description de l'Egypte*,
Antiquités, Descriptions, tom. ii. p. 61.

meanwhile I beg to be allowed to retain my own determination.

Now the numbers $29^{\circ} 58' 51''$, do come so abundantly within our rule of $2'$ discordance being allowed, that we might in so far at once declare the case practically proved. But that rule is not to prevent our testing any one particular instance more accurately still, if possible; nor was it intended to apply to exactly such a subject as the minutes of *latitude* angle. There is therefore no objection whatever, to any one asking, 'why the builders did not hit the theoretical angle of $30^{\circ} 0' 0''$ of latitude, a little closer, than to a distance of $1' 9''$ only?

To this, the answer seems to be,—especially when looking at the real Great Pyramid passage pointing to an actual star in the sky,—the asking, in Scottish fashion, of another question; viz., 'Ought not the latitude rather to be such as, with a mean amount of refraction added to it, will place the Polar point *visibly* to men, rather than theoretically only, at an angular elevation of 30° ?'

On some grounds, this view is decidedly to be preferred. But noting that there is only *one*, of the *two* daily meridian culminations marked by a material passage, where men could look out at the actual fact in the sky (during the building of the Great Pyramid, though not afterwards, for other and very different reasons), we may be safer in taking a mean between the two hypotheses; i.e., between an angle of 30° absolute from the equator,—and a certain

other angle therefrom, which, with the refraction added, would present an *apparent* elevation of the Pole to the same amount of 30° . And as the refraction at such altitude is on the average about $1' 37''$, such geometric polar angle is $29^{\circ} 58' 23''$: the mean between which and 30° , is equal to $29^{\circ} 59' 12''$.

But $29^{\circ} 59' 12''$, is still something very perceptibly greater than $29^{\circ} 58' 51''$, though no doubt a remarkable approximation. The original question may therefore still be put, by some who expect superhuman accuracy in others: viz.: 'Why did not the builders hit the mark even yet a little more closely? Or, why did they not carry the Great Pyramid $21''$ farther north, and make it thereby perfectly accurate in its geographical place?'

The answer here is simply, Go and look at the topographical position of the Pyramid; and see, that the realizing of those $21''$ would have taken the building off its noble hill, and buried it ingloriously in a broad bay of sand which intervenes to the north of it, and extends in that direction through several whole minutes of latitude; while if we alter the longitude also, to avoid that low ground, and shift the Pyramid westward as well as northward, we should find only the indistinct undulations of a desert valley for an indefinite distance in the exact parallel of $29^{\circ} 59' 12''$ of latitude. Hence there is in fact no other conspicuous or suitable rocky hill for the Pyramid to stand on, except its own hill, throughout all this region; for though the eminence

to the south of the palm-trees, is bold enough, it is very much too far southward for latitude purposes.

There was therefore no choice left to the builders, but to place the Pyramid on the hill where they did place it ; and if in being there, it is slightly in geographical error, they have indicated a strangely perfect knowledge on their part, of the existence of such an error ; for why, otherwise, upon any hieroglyphic theory of the Pyramid that has ever been brought forward, has that most massive building of the world,—when there was plenty of room southward for mere foundation,—been pushed so close to the very northern edge of the hill ! Yea, even so dangerously close to its northern cliff, that there is, just in front of the north-eastern corner of the Pyramid, a slicken-side scratched surface of rock, indicating a land-slip of part of the cliff to have already occurred there ; and still worse, there is a deep cleft in the local rock, 'a chasm,' according to Colonel Howard Vyse, preparing for another breaking away of the cliff, and passing slantingly under the front of the very Pyramid itself. (See Plates II., III., and IV., vol. i.)

The builders too knew of this most dangerous feature, for they filled it up with good masonry to a depth of forty feet, and cemented it over ; and they further made those enormous banks of their ancient rubbish on the northern front of the cliff outside (vol. i. p. 186), to keep it up, as it were ; recognising that a fall of that part of the rock would be ruinous indeed to the Pyramid. As yet

the rock has not given way, though it may always be considered as threatening ; but meanwhile, if ever a building vividly represented the scriptural phrase of standing on 'the utmost bound of the 'everlasting hills,'—it is surely the Great Pyramid ; reared, and with a remarkable reason for it, on the very ultimate northern edge and brink of its steep-sided, desert, table-land.

For its own *safety*, then, we would not wish to see the Great Pyramid pushed any farther towards the north : and it is surely far enough already in that direction, to satisfy the requirements of modern scientific travellers, in strict justice to their own latter-day work. Because, have their measurements of any of the angles of the Great Pyramid been conducted within an agreement amongst each other, of 21" ? Nay, have they been within 21' ?

Also worthy of note is it, before leaving this subject, that if the Great Pyramid be not quite far enough northward in latitude,—it yet comes nearer to what theory points out, than any other Pyramid whatever, large or small. For all the others in its neighbourhood, are to the *south* of it ; the second, third, fourth, fifth, and sixth, notoriously so ; and the seventh, eighth, and ninth,—when we consider, in proper scientific process, the places of their centres as compared with the centre of the Great Pyramid,—fall in the same category.

One rather disputable case, however, exists out-

side all these ; seeing that north of the seventh Pyramid, and north also of the latitude parallel passing through the Great Pyramid's centre, there is a system of inclined passages in a vertical and meridian plane, tunnelled into the rock of the hill,—and looking so much like the commencement for building a small pyramid,—as to have induced some authors to declare, that if no pyramid was ever actually erected there, men had *intended* to erect one, and may have begun it, though no stones are found there now. And such a pyramid,—though its proportions must have been insignificant, as being necessarily curtailed by the edges of the hill north and east,—would yet have been, as to its centre, a *little* nearer to the proper latitude desired by theory for the Great Pyramid, than the Great Pyramid itself.

This is serious. But on turning to Colonel Howard Vyse, we find that that most trustworthy authority, assisted by Mr. Perring, made careful measures of these passages (see fig. 4 on our Plate II.), and arrived at the conclusion,—that they are neither in the meridian line of the passages of the seventh, eighth, and ninth Pyramids ; nor at a commensurable distance, in any meridian line, to form one of a regular series of Pyramids with them along the eastern side of the Great Pyramid. Mr. Perring likewise expresses an engineering opinion, that the surface of the ground, near to and above these passages, was never *prepared* to receive building stones upon it ; and he alludes to Herodotus

noticing only *three* small Pyramids on the eastern side of the great one, as reason for concluding that no other small pyramids, other than the three now to be seen, ever stood in that neighbourhood.

But why was there *not* a complete line of them constructed? Or why was the partial line begun from the south instead of the north? And what were those inclined passages in the rock for, if not intended to have a pyramid erected over them?

The two first features of this rather over-much-demanding question, would be satisfied,—if it was considered reasonable, that the architects of the Great Pyramid would allow no other building to interfere with their mighty work in any of its higher attributes, not even in correct geographical position. And the last portion of the question,—which is the most important, and is even necessary to the whole,—throws some light on itself when practically examined.

For, look at the passages in plan and vertical section (Plate II.), and see that they are a system, in principle of arrangement, such as exists in no other Pyramid whatever, except the Great Pyramid; for there is the long descending entrance passage; an upward and opposite rising passage from the middle of that, like the Great Pyramid's 'first ascending passage;' then the beginning of a horizontal passage, like that to the Queen's chamber; and finally, the commencement of an upward rising Grand Gallery, with its remarkable ramps on either side.

The angles, heights, and breadths of all these are almost exactly the same as obtain in the Great Pyramid. And if the lengths only, are so curtailed as to be ridiculous in compairson,—or rather such as to show all the leading angular features of the Great Pyramid's passages within the space of a few feet,—that assists to a conclusion which the facts of the neighbouring azimuth trenches first prompted me to :—viz., that this system of inclined passages in the rock north-east of the Great Pyramid, was merely a trial, or model, cut beforehand into a spare part of the hill surface by the masons of the Great Pyramid,—to improve their understanding of the *internal* figures they were afterwards to form close by ; just as the azimuth trenches were to show the *exterior* angles. Hence, the Great Pyramid is finally and most decidedly left the northernmost, and nearest to the theoretical latitude, of all the Pyramids of Jeezeh, either at present, or ever, existing.

PROPOSITION VI.

' ANGULAR ALTERATIONS IN THE EARTH'S CRUST
HAVE BEEN PRACTICALLY INSENSIBLE DURING THE
EXISTENCE OF THE GREAT PYRAMID ?'

THROUGHOUT all our previous Propositions we have discussed differences between theory and fact,

as referrible only to errors of either ancient workmen or modern measures, combined with inevitable effects of dilapidation ; but where an interval of several thousand years is concerned, it may be expedient also to inquire, whether any slow natural changes of the earth itself,—though utterly insensible during all the period of existence of our post-mediæval civilisation,—may not have accumulated with greater time to some appreciable extent.

At the last meeting in Dublin of the British Association for the Advancement of Science, for instance, a learned traveller stated,—in connexion with a mathematical paper which had just been read on certain views regarding the interior consolidation of the earth,—that he had seen ancient buildings in Abyssinia which indicated a sensible difference in the direction of gravity at the time of their erection, from what obtains now. And, again, there was the question, much agitated by Dr. Hooke in his day, as to whether there is any slow progressive change in the place of the axis of rotation of the earth within its substance ;—or again of the crust of the earth over the position of the poles,—altering in that manner both the latitudes and longitudes of all places, to some minute quantity, in the course of many ages.

Had our observations at the Pyramid, alluded to under the last Proposition, come before Dr. Hooke, the practical Newton of his day,—he would inevitably have seized on the 21" defalcation of north latitude, and the 4' 30" west error of the Pyramid's meridian

line, as indicating an oblique movement of the north Polar point of the world in a north-eastern direction. And he would further have had by this time, in the successive decreases of the published latitude of Greenwich by every succeeding Astronomer-Royal during the last century, something like a confirmation of the latitude part of the effect closer at home.

But what are we, who live now, to think,—taking all things into consideration,—as to the Pyramid's evidence of such terrestrial change? This probably, that a shifting in place of the earth's axis of rotation within itself, if solid, or nearly so, to the amount of 21" in four thousand years, is utterly beyond all physical probability,—so overwhelming is the dynamical stability of the axis of rotation in so huge and heavy a ball as the earth; such a computation, though not for those precise numbers, having been made by La Place long ago, and confirmed, we believe, very recently by Professor P. G. Tait of Edinburgh.

The question, again, of the earth's crust being rather thin, and carried by variations caused in its local amount by special chemical and other actions, to or from the place of the pole of rotation of the grand fluid internal mass, supposed to remain constant,—has also, I believe, been considered; but without any one venturing to say how much change might be produced in the latitudes of places in a given time from that cause. We are left, therefore, only to

speculate on a smaller and more confined class of changes, produced either by temperature or volcanic agencies,—which push, twist, elevate, or depress sometimes whole continents, but more generally parts of them only ; and occasionally act in opposite directions within very small areas, according to the distance of the solid surface of the ground from, either the molten interior of the whole earth on which it is floating, or the fluid contents of subterranean lakes and cavernous receptacles of similar matter contained within its substance. Now the amount of *these* changes, is wholly without the power of theoretical science to compute ; and such a case as that of the Great Pyramid, giving the result of human experience through the longest series of years of any monument yet erected, is probably the best, if not the only, opportunity of practically ascertaining whether anything of the sort has really taken place.

With regard to the latitude effect, however, I would remark ; first,—that the defalcation of 21" is only chargeable on the Pyramid through reference to the deductions from John Taylor's figure of the monument ; for without that, we should have no means of knowing what the latitude of the Pyramid was thought or observed to be in the days of its building ; and, second,—we have shown topographical and other reasons why such an amount of error, if it existed at the time, might very properly have been neglected by the builders. But with regard to

the azimuthal deviation from the meridian, there is not only a much larger quantity to be dealt with there, but it is independent of John Taylor's or any other man's theory, further than this general belief,—that the Great Pyramid was originally intended to be correctly oriented; and that its builders had the capacity to place it so, true within 2', if not much less. Something is therefore to be explained in that anomaly; and we *may* have a reason to suggest in a future chapter, without requiring the Egyptian earth to have been twisted round 4' or 5' in four thousand years.

Meanwhile, though thus practically confessing that the great geographical ordinates of the Pyramid have not been materially interfered with by physical causes, there remain to be considered the probable effects of such disturbing actions, in altering the correctness of its lesser mechanical and geometrical features. Has the rock, for instance, under the Pyramid, been tilted up in one direction or another, thereby throwing out of the vertical or horizontal that which was once both plumb and level true?

As touching directly on this subject, we may turn to the article by M. Ernest Renan on 'Egyptian Antiquities,' in the *Revue des Deux Mondes* for April 1865, as giving both his own views and those of the extensively experienced Mariette Bey also. And there we read, that there is not a particle of deviation discernible in that most carefully constructed room of all the rooms throughout the Great Pyra-

mid, viz., the King's chamber; or, in the author's own words, 'Malgré l'épouvantable poids que porte cette chambre, elle n'a pas fléchi d'un millimètre; le fil à plomb n'y accuse pas la moindre déviation.'

Sorry am I to say that my observations upon the walls of the King's chamber, taken very carefully through means of the circular clinometer applied with a beam one hundred and twenty-six inches long, do not in any way agree with the above assertion; for they indicate, in the first place, very consistently, that every wall is inclined to the central *quasi*-vertical axis of the chamber by the amount of 3' 47"; and, in the next place, that that axis is tilted at the top towards the west by the amount of 6' 9", and towards the south by the amount of 6' 4" (vol. ii. p. 163).

That is the instrumental fact, which cannot be departed from until better observations are made; but the whole quantity of deviation is by no means to be necessarily put down to a permanent physical earth change, for the chamber's floor is greatly shaken and disjointed even since Colonel Howard Vyse's time,—either by the progress of dilapidation, or ruinous effect of a passing earthquake shock.¹ Let us therefore see what sort of tale the three inclined passages tell, touching depression towards the south. Such an effect, if general over the whole

¹ Such as that recorded in Mr. Sopwith's *Notes on Egypt*, to have occurred in 1856, and injured much the house of the hospitably-inclined English engineer of the railway from Alexandria to Cairo.

building, will tend to increase the dip of the entrance passage, and decrease the rise of the other two. And what do we find? Why, that the dip of the entrance passage is greater than the theory by 9', the rise of the first ascending passage less by 12', and that of the Grand Gallery also less, by 0' 35". But as the large deviations of the two first passages have already been shown to be probably due to error of construction on less important parts of the Pyramid, the only thing left securely outstanding to attribute to a general tilting of the whole Pyramid, is the 35" of the Grand Gallery; indicating therefore that the 6' of the King's chamber is a local error or masonry defect, magnified in angular value by the short radius of the walls.

There is another set of our observations, however, bearing on the point, viz., the measurement of the corner angles of the Pyramid's summit from the sockets below, by means of the Playfair altitude-azimuth instrument; and this would have been a very sufficient method, had there not been the one weak feature about it, that the dilapidations of the top rendered it most difficult to decide, within a few inches, where the general corners of the summit platform should be considered to lie.¹ Referring,

¹ On a future occasion it might be worth while to enclose the topmost course of stones, forming the summit platform of the Pyramid, with a grand square of carpentry: for that woodwork might be made in itself an approximately true square, and the position of any one of its corners would be regulated, not by that same corner, only, of the broken stones, but by the general contour of the whole topmost area of stones.

however, to vols. i. and ii. pp. 538 and 173, for the efforts that were made to be accurate in this point, we have now only to deal with the observations as taken and recorded at the time; and they are as follows: the south-east and south-west observations give a greater tilt to the Pyramid than the north-east and north-west, by $0' 30''$,—implying a dip of the ground southward by that angle; and the north-east and south-east give a greater angle than the north-west and south-west by $2' 39''$,—implying a dip of the ground eastward by that angle.

These quantities evidently throw discredit on the large angles of deviation in the King's chamber, as an *earth effect*; but they coincide, it is not uninteresting to remark, with the south-east dip of all the limestone strata composing the hill on which the Pyramid stands; and which may be distinct from any large portion of the rest of the country, even as it is believed generally in Egypt now, that the land of the Delta is sinking, while that of Suez is rising. Hence, while we omit making any further reference for the present to the eastern element of angular variation about the Pyramid, we are bound to acknowledge that every one of five different subjects of observation,—nay, six, including the geological strata,—have combined in giving a dip *southward*, as an effect that has come over the foundations of the Pyramid with time. The amount, however, of such dip can only be inferred with safety from the large radii of the Grand Gallery,

and the corner observations of the whole Pyramid ; and as it is indicated in both these quarters to be barely more than 32", such a quantity may well be neglected in any ordinary discussion about Pyramid angles. Though there is no harm, and perhaps even the merit of following strict rule, if we add that number of seconds to the angle of the Grand Gallery, as observed in A.D. 1865 ; increasing its $26^{\circ} 17' 37''$ to $26^{\circ} 18' 9''$. Or bringing the observed angle of that noble, and most ancient, hall,—within 1" of the $26^{\circ} 18' 10''$ independently demanded by modern theory, and published to the world before our observations were made.

PROPOSITION VII.

' HYPSONOMETRY OF THE GREAT PYRAMID ' ?

Datum Plane.

THE datum plane to which it is proposed to refer all levels taken at the Pyramid, is the upper surface of the pavement, alluded to in connexion with the corner sockets (vol. ii. p. 137) ; and found to be, practically even with the floor of the south-west socket ; from six to ten inches above, the floors of the north-east and north-west sockets ; and rather more above, the lower floor of the south-east socket. The same pavement too, it is believed, from whose broad and well constructed surface, in the middle of

the northern side, Colonel Howard Vyse found the inclined slope of the whole Great Pyramid flank at once to begin.

Present Vertical Height.

This feature may most appropriately be reckoned from the pavement's upper surface, as the lower starting-point for such measure, up to the flat, square area on the summit, as its higher reference. On that area, near four hundred inches long in the side, there are, it is true, two fragments of courses of masonry, one on the other, and twenty-one and nineteen inches in respective heights. A learned authoress, too, a few years ago, described herself and party very racily mounting on them to get a little nearer still to the sky ; and they do enable any one to stand absolutely higher by forty inches, than if on the four hundred inch area level. But they are unfortunately too fragmentary and low, to assist one in forming safe conclusions respecting the whole deficit between the present broken, and the ancient unbroken, Pyramid top,—or a quantity closer in linear height, upon almost any theory, to 380 inches. It seems better, therefore, to terminate the vertical measuring at the four hundred inch area, which does possess some degree of completeness, and offers an approach to those required data on which the final quantity must be computed.

Another description of that area, is this ; viz., that

it forms the upper surface of the 202d course of masonry from the Pyramid pavement upwards. Hence, when good measurers give the height of '204 courses,' they may be expected to have included the two fragmentary sets, and require to have forty inches subtracted from their observed height to compare it with ours.

These points it is well to settle, before coming to the height itself; for the time may arrive, when more of the upper courses will have been broken away,—as several have been already within the historical period,—and the 'topmost area' will then signify a different number of courses from the pavement upwards, from what it does now.

How many courses there may have been at any particular past epoch, it would be difficult now to say; but probably within the last three hundred years, there were never more than 204; most likely less,—the maximum required to complete the whole figure of the Pyramid, with a topmost corner stone 100 inches thick, and the two next courses approximating to the same thickness (agreeably with the still visible masonry finish of the Northern Pyramid of Dashoor, and the superior size of the lower socket-holes, and lowest row of casing-stones at the Great Pyramid), being something like 210,—with an uncertainty of not more than two or three, one way or the other. Wherefore, it is melancholy to find among earlier travellers such varied statements as the following, —in which their absolute errors as to courses,

are often further illustrated by the heights assigned :—

	Date.	No. of Courses of Masonry existing at the time.	Height of Great Pyramid.
			British inches
Sandys,	1610	255	...
Greaves,	1638	207 or 208	5988
Melton,	1661	206	6240
Vausleb,	1664	255	7944
Lucas,	1699	243	8748
Egmont,	1709	206	6000
Pococke,	1743	212	...
Perry,	1743	...	8244
Davison,	1763	206	5532

That all very recent travellers are talking about the same 'topmost area' surface is evident, both from the age of many of the inscribed names of visitors, as well as from the length of the side of said area as measured and given by them ; for every lower course will evidently have a greater length of side, to an extent extremely easy to measure. When, therefore, Messrs. Aiton and Inglis, in 1865, give 195 courses on the north-east angle, and 199 on the south-west ; or Mr. Lane in 1843, 203 courses, and some of the French *savants* in 1799, also 203,—we may suspect a misapprehension in counting, and not an alteration in the Pyramid.

Of these observers, the first statement, as I have shown in vol. ii. Sect. v, has so many anomalies in the first fifty steps from the ground, that I have not attempted to follow the rest. But Mr. Lane, of the *Modern Egyptians*, was a phenomenon for accuracy,

and produced one of the most careful drawings of the Pyramid ever made by human hand ;¹ while the French *savants* of 1799, devoted themselves, in number, and with peculiar enthusiasm, to linear numerical measures about the Pyramid (which kind of mensuration was indeed special to the science of that day, when physics meant the application of geometry to a subject, and was as yet innocent of geology, chemistry, and many other branches both of natural philosophy and natural history, which are now occupying the chief attention of the mass of learned men). It was with no small relief therefore, that I found the 203 courses of the French *savants*, and apparently those of Mr. Lane also, meant the same as my 204 ; for their lowest, and which some of them (*i.e.*, M. Le Père, and Colonel Coutelle), have actually entered in two portions of 20, and 52 inches respectively in height,—must really be considered as two distinct Pyramid courses.

That they were long held as one, was partly due to the first French measures made in 1799 or 1800, being previous to the later excavation of MM. Le Père and Coutelle, which took place only '*in the month Rainy, of the year 9*' (January 1801) ; and first disclosed the full depth of the supposed lowest course being, not 40 inches only, but 72 inches, or in excess of any other known Pyramid course ; and partly also to the circumstance that, at the north-

¹ See Plate XII. of Colonel Howard Vyse's and Mr. Perring's folio views of the Pyramids. London, 1840.

eastern corner of the Pyramid, the upper surface of this 72-inch duplex course, is, for a small space, seen to be formed in the solid standing rock of the hill. Whence M. Jomard concluded, that there was anciently a raised pedestal of seventy-two inches on which the Pyramid stood, and that its inclined sides only began *above* that level.

Such an idea, however, has not only been directly disproved since then, by Colonel Howard Vyse's casing-stones, as already mentioned, beginning at seventy-two inches *below* that level,—but it is also shown, by our photographs now brought home, combined with the measures, to be a mistaken apprehension of Pyramid masonry.

For these peculiar modern documents testify, 1st, That that portion of a rock course seen at the north-east corner, was abundantly within,—not only the external casing and proper position for a base or pedestal,—but within, likewise, several thicknesses of the stones of the inner masonry courses, themselves also within the casing-stone series.

2d, The standing rock was used merely to supply economically a portion of the internal bulk of masonry,—not to form any part of, or react upon, the external form and surface of the Pyramid. For this, indeed, it would not have been good enough; and the Pyramid builders knew the fact so well, that *therefore* they sent painfully to the Mokattam or Arabian hills on the eastern side of the Nile, for the denser limestone from there, for the outside blocks.

And it is not a little notable, that this north-eastern portion of the native rock course, and which has only recently been disclosed by the process of dilapidation—is already far more decayed than any of the fragments of the casing-stones found by our exploration ; which fragments too, though now, and for the last one thousand years, buried in rubbish, —must have been exposed on the flanks of the Pyramid to the weather, for full three thousand years previously ; or for several times as long as this unhappy piece of rock-course has been visible to men.

3d, The portions of standing rock thus employed to make up the *interior* substance of the Pyramid, though cut square and level on the upper surface of their terraces, are by no means also cut in every case coincidentally with the surfaces of the abutting courses of masonry ; and as the rock addition is only partial and accidental, while the masonry courses are structural and extend unbroken around, and as we believe through, the entire Pyramid,—we cannot allow the enumeration of the latter, to be interfered with by a casual and local feature of the former. Many of the data of these conclusions are rendered in the Photographs described in Section v. of vol. ii. ; and *their* general testimony is pictorially represented in Plate III., which gives a *diagonal* sectional view of the north-east corner of the Pyramid, and shows the subservience of the rock to the masonry courses, at that point.

Hence we trust there is no real error in represent-

1. The first group of people who are affected by the disease are those who are in the first stage of the disease. This group is the largest and is made up of people who are in the first stage of the disease.

2. The second group of people who are affected by the disease are those who are in the second stage of the disease. This group is the second largest and is made up of people who are in the second stage of the disease.

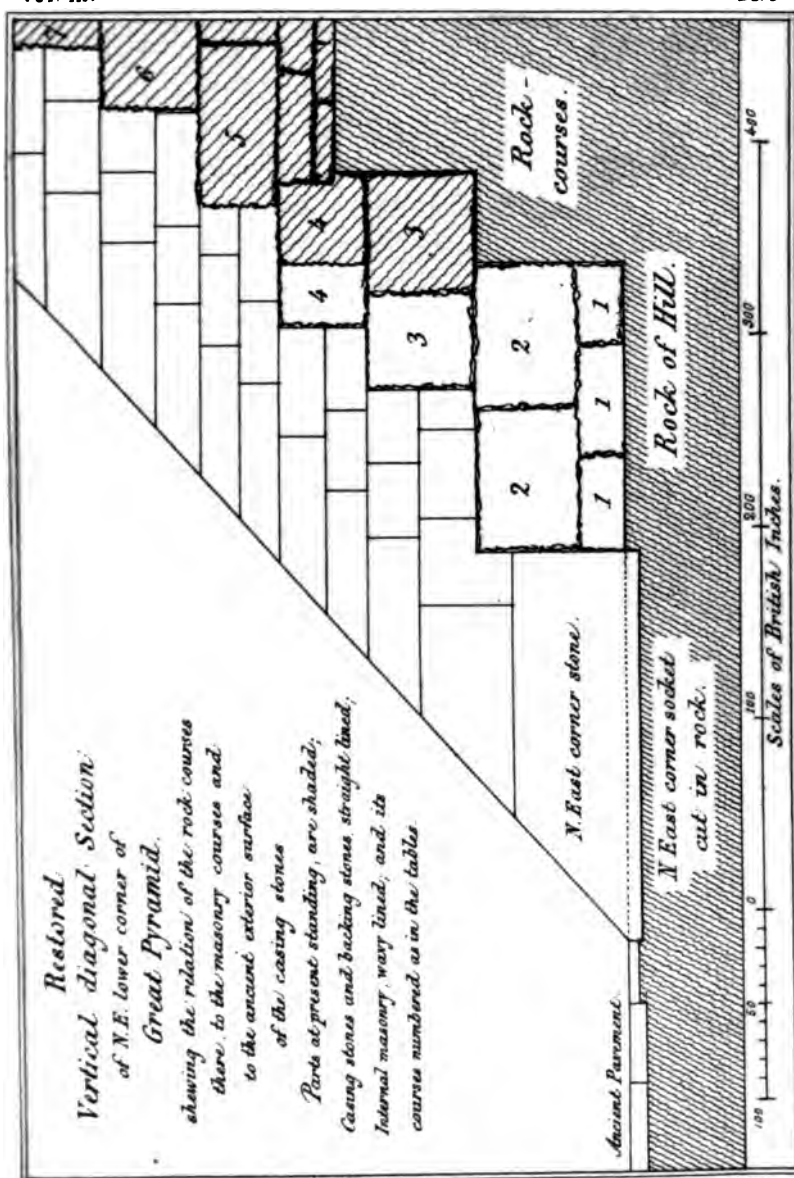
3. The third group of people who are affected by the disease are those who are in the third stage of the disease. This group is the third largest and is made up of people who are in the third stage of the disease.

4. The fourth group of people who are affected by the disease are those who are in the fourth stage of the disease. This group is the fourth largest and is made up of people who are in the fourth stage of the disease.

5. The fifth group of people who are affected by the disease are those who are in the fifth stage of the disease. This group is the fifth largest and is made up of people who are in the fifth stage of the disease.

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1. *Journal of the American Medical Association*, 1997; 277: 1001-1005.



ing the courses between the *pavement* below, and the present (A.D. 1865) *platform* at the top of the Pyramid, as 202 ; even by the French measures, and Mr. Lane's also. And we then have, for the vertical height between these two places, the following results of different authorities :—

Measurers.	Date A.D.	Mode of Measure.	Reference.	British Inches.
MM. Jomard and Cecile, .	1800	Steps,	Vol. ii. Sect. v.	5433
MM. Le Père and Coutelle,	1801	Steps,	Vol. ii. Sect. v.	5435
M. Nouet,	1800	{ Trigono- metry, }	Vol. ii. Sect. v.	5443
Colonel Howard Vyse, .	1837	Unknown,	His own work.	5409
Mr. Lane,	1843	Unknown,	{ Mrs. Poole (5472-40.) }	5432
Mahmoud Bey, . . .	1862	Barometer,	{ Alexandrian Pamphlet of 1865. }	5445
C. Piazza Smyth (April), .	1865	Steps,	Vol. ii. p. 131.	5445
Messrs. Aiton and Inglis, } (May), }	1865	Steps,	Vol. ii. Sect. v.	5475

The simple mean of all which comes out, 5440 British inches.

Ancient Vertical Height.

From the present fragmentary portion of the Great Pyramid, to deduce the height of the ancient complete structure, theory must be referred to in some way or to some extent ; and the simplest idea appears to be, that the now missing portion was only a continuation of the present structure ; or, that the building was simply and altogether a Pyramid, but ' cased' about, of course, as already

much alluded to. Yet this conclusion has not been always or usually followed; for many travellers have had a great fancy for mounting a colossal statue on the existing platform.

words to
the Moeris
pyramids

After searching for their reasons, however,—they appear to be no other, or better, than that ‘they thought such a termination to the Pyramid *would look well* ;’ or such imperfect reasoning and positive statements without foundation, as the following :—

‘On the top of the greatest Pyramid there was ‘anciently a statue or a *colosse*. This appears, because it is not sharp as the others, but plain; and ‘there are yet to be seen great pits, which were to ‘keep fast the *colosse* from falling.’—F. VAUSLEB, 1664.

And again :—‘The other two Pyramids terminate ‘in a point, and hence ’tis conjectured, that there ‘might have been some colossus erected on this.’—VERYARD, M.D., 1701.

On the opposite side, however, it is alleged by learned Egyptologists, that—1st, the Egyptians never put their colossal statues on a height; 2^d, no one ever saw a statue of any kind on the top of any Egyptian Pyramid; 3^d, the hieroglyphic representations give only the mathematical form of a Pyramid, or terminate it at the top in a point; and 4th, though the topmost area now measures near 400 inches in the side, it has been traced backwards, through various authors, mischiefs, and dilapidations, gradually decreasing in size from now up to the time

of Pliny, when it was reported to have been only 100 inches in side length; and as the casing was still existing in his day, such statement, if its measure can be depended upon,—indicates that the Pyramid had then lost only its *chief* and *topmost corner-stone*.

Hence we adopt the Pyramidal hypothesis for completing the present figure of the Great Pyramid, as the only one at all probable; but must steer wide of an error in applying it, which even so eminent an authority as Sir Gardner Wilkinson has fallen into, on p. 173 of Murray's *Handbook to Egypt*. For therein, that admirable traveller computes rigorously the height of the missing part required to be added to the present decapitated, to reproduce the ancient complete, Pyramid. But he computes it on the datum of the *present* length of the sides of the summit-platform, instead of the *ancient* length at that level,—*i.e.*, the present quantity increased out horizontally at either end by the thickness of the casing-stones and backing-stones; which important layers were once there, and must be virtually replaced now, in any attempt to compute the *original* height of the monument.

Attention to this refinement in practical construction at the Pyramid, will fortunately be found to remove almost entirely, a difference to a serious amount between two methods of Sir Gardner's for arriving at the same thing, *viz.*, the ancient height. For whereas on one hand he gives a computation from Howard Vyse's data of Pyramid base-side, and

casing-stone angle, as making the whole height of the complete Pyramid 5832 inches :—on the other side, he computes the height of the missing portion at 240 inches ; and that quantity being added on to the same authority's measured height of the *present* platform, or 5409 inches, gives only 5649 inches for the ancient height by that method ; or leaves a difference of 183 inches between the two results,—a difference large enough to invalidate any theory on which the calculations are founded.

Better instructed, however, by his example, we now proceed thus :—1st, The vertical height of the ancient, and complete, Pyramid,—given by the ground base-side = 9140 inches (see page 136), and the angle of slope = $51^{\circ} 51' 14''$ —amounts to 5819 inches.

2d, The upper platform side of 400 inches (vol. ii. p. 132), increased by 200 inches,—for twice horizontal thickness of the casing-stones of old (p. 27),—yields, with the same angle, a vertical height of 382 inches ; which, being added to our previous mean measured height of said platform, or 5440 inches (p. 67), gives for the ancient full height, in this manner, 5822 inches. That is to say, it differs by only 3 inches from the former result, where *no* part of the height was *directly* measured ; and enables us to state the quantity now being sought,—or the *ancient* vertical height of the Great Pyramid from its pavement plane upwards to its absolute apex,—as something that must have been very near indeed to 5820 British inches.

Floors of the Chambers.

The heights of the floors of the Queen's and King's chambers in the Great Pyramid, are important theoretical quantities to have determined. But the only two full authorities to be referred to, are, Howard Vyse and Perring in 1837, and Aiton and Inglis in 1865; for the French interior of the Pyramid has many glaring errors; and my own measures, though taken with more care than perhaps any others, were not connected, for want of opportunity and means, with the exact features of the ancient outside of the building. Hence the numbers we here refer to are—

Messurers.	Date A. D.	Queen's chamber, its floor above pavement.	Passage floor.	King's chamber, floor above pavement.
		British inches.	British inches.	British inches.
Vyse and Perring, .	1837	808	830	1665
Aiton and Inglis, .	1865	860	891	1720

The differences of the authorities are evidently large; but being in the same direction as their differences in the whole height of the Pyramid from the mean of the observers,—we may expect the truth to lie between the two. It will be noticed also, that agreeably with what has been remarked on these chambers by other persons, each of the observers makes the level of one chamber very nearly half the

height of the other ; though this approximate equality requires the general *passage* floor to the Queen's chamber to be taken, in Howard Vyse and Perring's case ; but the chamber-floor itself, in Aiton and Inglis's. This is a difficulty, though, which need not be very much dwelt on now, since both chamber and passage floors, as abundantly shown in vol. ii. p. 60, are in an unfinished and negative condition. Assuming, however, Howard Vyse as the correcter expression of the idea,—my own observations may be made some use of on that hypothesis, as they allow the *difference* of level of the chambers to be determined pretty well.

Computing, therefore, 1883 British inches, or my measured length of the Grand Gallery, with an angle of rise of $26^{\circ} 18'$, as observed,—we have a vertical height of 834 inches. To which, adding 1 inch for the elevation of the floor of the King's chamber above the great step at the head of the Grand Gallery, 6 inches for the elevation of the step's surface above the southern termination of the floor slope produced to the south wall, and 5 inches for the southward dip of the reputed horizontal passage leading to the Queen's chamber ;—but subtracting 6 inches for height of the north end of that passage above the beginning of the Grand Gallery floor,—we have, finally, 840 British inches. That being our result for a quantity, which, according to Howard Vyse, is repeated no less than three times in the building ; or 1st, from the Pyramid's pavement to the floor of

the Queen's chamber passage ; 2*d*, from that level to the floor of the King's chamber ; and, 3*d*, from that to the roof of the topmost chamber of construction, the highest known room in the whole Pyramid.

Hence for height of Queen's chamber passage floor, above pavement of the Pyramid ; we have in all, by

	British inches.
Howard Vyse and Perring,	= 830
C. Piazza Smyth,	= 840
Aiton and Inglis,	= 891
Mean,	= <u>854</u>

and for height of King's chamber floor, above pavement of Pyramid—

	British inches.
Howard Vyse and Perring,	= 1665
C. Piazza Smyth,	= 1680
Aiton and Inglis,	= 1720
Mean,	= <u>1688</u>

To which we may add, that the height of the roof of Campbell's chamber,—the angular-roofed topmost chamber of construction above the King's chamber floor,—is at the height above the Pyramid pavement of, not the 2496 as given by Colonel Howard Vyse, but more probably, 2540 British inches.

Similarly also, the roof of the subterranean chamber will be depressed, not 1088, but more nearly 1112 British inches ; and its floor, with the Colonel's given wall-height of 138 inches, will be, not 1226, but 1250 British inches below the Pyramid pavement. But then, again, that wall-height is a special maximum in a chamber which, though its roof is level and truly rectangular, its

floor (like all the rest of the room, chiselled out of the solid rock) is so excessively uneven as to make the walls in various places of all heights from 40 to 138 inches. (See Plate IV.) Something more nearly approaching, therefore, to a mean of the various heights, would be safer to employ; and as the quantity of 91 inches—not very different from a mean—is given by the very point of the floor, on which Colonel Howard Vyse and Mr. Perring have marked ‘the centre of the Pyramid,’—or as being touched by the central vertical axis of the Pyramid produced downwards,—we prefer to adopt that height in place of 138 inches. Hence must be reduced our final statement for the depression of the floor of the subterranean chamber below the Pyramid pavement, from 1250, to 1203 inches.

Fresh-water Levels.

By an approximate hand-levelling method, I ascertained that ‘East Tombs,’ where we lived, and where the meteorological observations were taken, was about 980 inches below the pavement of the Pyramid; the sand-plain at the foot of the hill, about 1400 inches; and the water in the well of King Shafre’s tomb, about 1800 inches below the same datum plane in the month of February 1865.

Next, by closer levelling with a regular surveyor’s telescopic levelling instrument and staff, Mr. Inglis ascertained, in the month of April 1865, that the sand-plain at the foot of the Pyramid hill was

variously between 1380 and 1460 inches beneath the Pyramid pavement ; that the water in the well of King Shafre's tomb, was at the same level as that in the many agricultural wells in the neighbouring irrigated plain ; and that such level was, 1766 British inches beneath the Pyramid pavement.

In Messrs. Aiton and Inglis's large MS. plans and sections of the Pyramid, such level is attributed to 'the Nile;' yet there is reason to believe that the Nile itself was not measured on the occasion, but only believed on principle to coincide with the well-water near the Pyramid hill,—a hydrostatic circumstance, however, by no means necessary to obtain, as we shall presently see.

Thirdly, here,—but primarily in point of time,—Howard Vyse and Perring made many and accurate observations of levels in the years 1837 and 1838 ; arriving at some curious results too which puzzled themselves, and several other Egyptologists of the period also. These results were mainly, that at certain seasons of the year, the well-water near the Pyramids was much, even many feet, above, though sometimes as many below, the water in the Nile,—down to whose very river course those gentlemen appear really to have carried their measures.

But they believed on theory, that the well-water at the Pyramid should always coincide with the *existing* level of the Nile ; and on finding the well-water so much higher at times, they concluded rather hastily, that it must be fed by local springs

from the Pyramid hill. Knowing, however, that from the rainless character of the climate, true springs are unknown in Egypt,—they pounced on this apparent or supposed proof they had stumbled on, of the existence of *one* spring supply of water at the Pyramids,—as indicating the existence of a special phenomenon of extraordinary importance in the Coptic land. Sufficient, indeed, they considered, to explain that very strange story which Herodotus gathered from the Egyptian priests, about the shepherd Philition and his flocks being located for so long, and so remarkably, about the Pyramids, at the time of their building.

The hydrostatic theory, however, was wrong, or imperfect rather, though the facts were well enough observed. For, on the great scale of the Egyptian valley, the well-water at its borders appears to be supplied by a slow, average effect only of saturation of the soil by the river; whence, *time* must be taken into account; and the greatest height of water in the wells, two or three miles from the parent stream, can only occur several weeks or months after the greatest height of the actual river-inundation. Neither is it then so marked a phenomenon; for the resistance of some miles of soil tends to create in the wells an approach to a mean level all the year through, or between high Nile, low Nile, and high Nile again. Hence it is easy to see, that the water in the wells at the Pyramids *must* be sometimes higher and sometimes lower than the

water in the open bed of the river, nearly three miles off,—and yet have been all originally derived from thence. Add to which natural phenomenon, the effects among particular wells of more or less drawing upon them during the day, for the supply of some hundreds of workpeople,—and that some of the shafts were in the solid limestone rock, where the water could hardly get in at all, while others were in porous rubbish ;—and then the anomalies nearly vanish. Wherefore we may condense the Colonel's observations as follows, and consider them in so far, as very useful and well-observed facts :—

	British inches.
Sand-plain near the Pyramids, below the pavement of the Great Pyramid, from	1500
	to 1536
High Nile level in October 1838 (above the average), .	1647
High Nile level in October 1837 (below the average), .	1714
Well-water in June 1837, in shaft No. 3, one of many such wells,	1755
Well-water in October 1838, in same shaft,	1779
Mean Nile level in 1838,	1796
„ „ in 1837,	1805
Low Nile level in June 1837,	1896
„ „ in June 1838,	1945

It is observable here, that the high Nile of 1838, which Colonel Howard Vyse describes as above the average, has barely the height above the previous mean Nile,—of what other authors, as Sir Gardner Wilkinson and Mr. Lane,—both of them with larger and more varied Egyptian experience,—attribute to an ordinary rise of the river at Cairo ; neither are the low Niles by any means so low, as those observed by the French *savants* from 1798 to 1801.

We shall not be far, however, from the truth, if we combine all the results (see the French measures in vol. ii. Section v.), and consider for the year 1865 that the following levels hold good :—

	British inches.
East Tombs station, below Pyramid pavement, .	= 980
Sand-plain, in parts,	= 1400
Do. in other parts,	= 1500
Ordinary high Nile in October,	= 1650
Well-water near the Pyramid in April,	= 1780
Ordinary low Nile in June,	= 1950

These three last levels, however, vary progressively with *long continued time*; for, according to the very sure testimony of Sir Gardner Wilkinson and the monuments,—the bed of the Nile, as well as the surface of the irrigated land, goes on elevating every year by deposited matter, to the extent of about 4·0 or 4·5 inches for each hundred years near this part of Egypt; or from 160 to 180 inches in four thousand years. A period this, taking us back to a very remote date, but which we may have to deal with on paper, and when the fresh-water levels quoted, were a large number of inches lower than they are now.

Sea-water Level.

The Pyramids are distant about ninety miles direct from the Red Sea; and one hundred and ten miles direct from the Mediterranean, but one hundred and fifty along the course of the Nile. Recent levelling operations having shown the identity of the mean levels of the two seas,—we can turn our

attention to the Mediterranean alone, in attempting, from the length of course and character of the Nile, to estimate both seas' depression below the Pyramid base. To this end, we have to deal with the river, not when in flood and violent current, but rather at low Nile, when its stream is more regular; though still very notable, as indicated by trafficking boats being wafted along by the current against any, but the strongest, winds blowing in the opposite direction.

What is the fall, then, per mile on the surface of the water in the river for the last one hundred and fifty miles of its course ?

For the mean distance between Assuan and Rosetta, or 720 miles,

Sir Gardner Wilkinson says about, per mile, . . . = 6 inches.

And Professor Chaix, about = 5·8 „

From the Nilometer at Rhoda, when the Nile was at

its lowest in 1846, to Tineh on the Mediterranean,

according to M. Talebot, were 554 inches of fall,

equal, on 150 miles, to 3·7 per mile. (This result was

kindly communicated to me by Mr. Samuel Birch

of the British Museum, from the late Leonard

Horner's paper in the *Philosophical Transactions*), .

= 3·7 „

'Cairo' is stated by Russegger to be 780 inches above

the sea-level, per mile of distance,

} = 5·2 „

The Rhine falls in the last 300 miles of its course, per

mile,

= 4·0 „

And the Thames from Chertsey to Cheddington, per

mile,

= 17·5 „

From all these particulars we may pretty safely take for an *ordinary* low Nile, 4·2 inches per mile, on 150 miles,—or, 630 inches. Which, being added to 1950, or the previously stated level of such Nile, gives 2580 British inches, as the depression of the

sea-level below the Pyramid pavement for the epoch A.D. 1866.

But was this element different in amount, four thousand years ago? On one side we have our own observed fact of a dip of the Pyramid pavement south and east; also a generally believed in, slow sinking of the Delta region of the Nile; and a probable alteration of the agricultural physical aspects of upper Egypt, by the escape of the waters of the Great Ethiopian lake of William Osburn, subsequent to the epoch of the Pyramid's building. But, on the other side, the apparent dip of the Pyramid pavement in one direction, may have been caused by an elevation of it in the other,—making no difference in the hypsometric position of the centre; even as the sinking of the Delta region, is said to be at least made up for in the intervening country, by a rise of the land near Suez; while a bursting of the supposed Ethiopian lake may be attributed to many other more likely causes, than a large alteration of the levels in the Pyramid region.

Altogether then, the historical evidences may be certainly considered to imply, that the change, if any, in relative level of sea and Pyramid base during the last four thousand years, must have been very small; and the same idea is given by our Plates II. and X., representing John Taylor's theory, as extended by myself, to meet the positions of the several passages in the Pyramid.

When last referring to Plate II., we contented ourselves with computing the *angles* resulting therefrom ; but let us now calculate the *lengths* of the several *lines* concerned, viz., thirds and fourths of the semi-side of the central square there depicted ; the data for calculation being,—the angles already assigned,—and, the number of 9140 British inches elsewhere concluded to be the closest measured approach to the length of one side of the Pyramid's base, or the line B D in Plate II.

Had the sea-level been the only hypsometric quantity successfully approximated to by the hypothesis, I would not have called attention to the circumstance ; but we have also,—and in addition to the whole height of the Pyramid,—the levels of the topmost construction chamber, the King's chamber, Queen's chamber, subterranean chamber,¹ and the ancient well-water, all closely represented ; as will be evident from the following tabular statement, both of practically measured, and theoretically computed, hypsometric values :—

¹ This chamber exhibits the largest difference found anywhere, between theory and observation ; equal to 87 inches on a run of 1200 inches. But that is rather the necessary consequence of the residual practical anomaly or correction introduced by the builders, in that—for some reason not hitherto explained, or even suspected, by any modern author,—they ceased the dip of the entrance passage, and made it nearly horizontal for a short distance before reaching the subterranean chamber. And yet, it is possible that an important reason, both symbolical, and structural, may appear in our next division of this volume. (See Plate IV.)

HYPSOMETRIC TABLE OF THE GREAT PYRAMID.

Names of Parts alluded to.	Letters in Plate II.	Observation.	Theory.
		Measured Quantities.	Computed Quantities.
		British inches.	British inches.
Ancient height of Pyramid, .	A C	+ 5820	+ 5819
Present height, A.D. 1865, .	...	+ 5440	...
Outcrop of air-channels on } ancient surface, }	(?) ...	+ 3230	...
Arab's half-way corner niche, (?)	...	+ 3203	...
Roof of topmost construction } chamber, }	C I	+ 2540	+ 2578
Floor of King's chamber, . . .	C V	+ 1688	+ 1719
Floor of Queen's chamber pas- } sage, }	C U	+ 854	+ 860
Pavement of Pyramid,	D C B	0	0
East Tombs meteorological sta- } tion, }	...	- 980	...
Mean floor of subterranean } chamber, }	C Z	- 1203	- 1290
Sand-plain, east of Pyramid-hill,	...	- 1450	...
Present well-water level, . . .	...	- 1780	...
Ancient well-water level, . . .	C Z'	- 1950	- 1934
Sea-level present and ancient, .	C K	- 2580	- 2578

PROPOSITION VIII.

MATERIALS OF THE GREAT PYRAMID ?

AFTER the frequent mention in vol. i., of the materials met with in and about the Pyramids, and the further description of hand specimens in vol. ii. Sect. v., little more notice of that subject would seem to be necessary here ; especially as the natural substance in which nearly pure geometric forms have

been executed, can be of no importance *directly* to the theory of them,—though of some indirect influence touching both the lasting powers of the monument they compose, and a few other questions connected with its human history and interests. The present is, however, the appropriate portion of our book, wherein we are bound to bring before our readers' attention, and against our own observations, any and every antagonistic statement that can be found,—if it can only claim the smallest respectability of origin, or be likely, in the present educated day, to claim a single believing soul on its side. And we make this proviso, because, there *have* been some things hastily written about the Pyramids in mediæval times,—as 'that the Pyramids were built, 'not by men, but by fallen angels, for *they* only 'could have moved stones four hundred feet long,' 'etc. etc.,—which no one would thank us now for occupying their time with: especially too, when some of those things were written with reference to features, where the several sets of measured numbers which we have brought together in vol. ii., contain their own internal evidences, and are capable of giving up a silent story of proof to all reflecting readers, more convincingly than any verbal attempt of ours could speak for them.

But advanced, as we now are, to some special subjects beyond the bounds of numerical demonstration,—we must here request indulgence for some extent of mere speech, in order to set forth in their

true colours a few of the extraordinary things which a student of Pyramid literature, even in the plain-sailing department of 'materials,' may still expect to find by his wayside; and in such a position, or brought there by men with such authority, that they cannot be passed over altogether unnoticed.

Composition of the Pyramid Hill.

We have already stated, as one of the broadest-based foundational truths of the region, that the Pyramid and neighbouring hills are composed of limestone full of fossils, and without any trace of igneous or metamorphic action of any kind or degree; to the utter impossibility, therefore, of certain published theories, as to Egyptian Pyramids being always formed around basaltic protrusions of rock. But, to our great surprise, having met since then with an officer from India, employed for many years in that Peninsula on geological surveys, he spoke with the greatest confidence of the 'trap dykes' on the Great Pyramid hill. He had seen them himself, 'when he visited the Pyramid on his way home from India, and there was no doubt about the matter; for they, the trap dykes, were cropping out on the eastern edge of the hill through the other strata and the sand'!

'Were they standing up, then, as planes or walls of rock above the surface?' we asked.

'Not exactly,' he replied; 'the chief plane or dyke that had once stood up was now lying in

'pieces *in situ* at the foot of the hill ; but the case
'was nevertheless perfectly clear, for the dyke
'appeared again higher up the hill ; a regular
'greenstone dyke, such as every geologist would
'distinguish in a moment, and at any distance, from
'limestone !'

'Had he judged of it from a distance, or by going
'to the place and tracing the vein of greenstone
'material in contact with the beds of limestone ?'
we again inquired.

'Oh ! only at a distance,' responded he ; 'in fact,
'he did not leave the usual road by which all visitors
'ascend the hill, to the Pyramid ; but the notable
'elevation of that road had enabled him to see these
'evident traces of igneous rock, just a little way off,
'to his left hand !'

'Then, now, I know precisely what you are allud-
'ing to,' I was enabled to reply ; 'viz., to the black
'basalt stones which do appear two or three times
'in a line straight eastward from the Pyramid
'down the side of its hill to the plain, and on a
'track only a few feet south of the visitors' road of
'ascent. But I have been amongst those stones often,
'and turned many of the smaller ones over, and
'found them to be only loose masonry blocks
'brought from elsewhere ; and now to be seen on
'that spot, as having once formed there some part
'of a well-shaped building ; perhaps a tramway ;
'and even still showing a carefully prepared, if
'not also polished, surface on one side, and some-

‘times even on two adjacent sides meeting at a particular angle.’

After this, the officer admitted ‘that he might have been mistaken on the subject of *natural* dykes; though, as for the materials of the stones he saw, being igneous rock,—what he was now told, proved that he had not been deceived *there*; and so he felt sure at the time.’

Internal Substance of the Great Pyramid.

The plain and simple account by Howard Vyse and Perring, who excavated extensively in various parts of the Pyramid, is,—that excepting a small proportion of the rock of the hill left standing,¹ and the granite linings in and near the King’s chamber, with a few others,—all the rest of the Pyramid substance is built of rectangular blocks put together by masons’ art, and in a limestone material. This material is also stated to be generally the product of the Pyramid hill; but occasionally, the denser rock of the tablelands on the eastern side of the Nile,—and distinguishable still, not only by that greater density, freedom from nummulites, and uniformity of consistence,—but by quarry-marks, more or less legible, in red paint, being usually found on the under or inner sides of the blocks formed out of it.

Fully confirmatory of every item in this account were all my experiences, so that I had considered it

¹ ‘Averaging 8 feet in height over the whole base of the Pyramid,’ they say; i.e., 8 feet only out of the whole height of nearly 490 feet.

to have disposed for ever of all the talk of some men about white marble ; of others, that Herodotus's bringing stone from the Arabian hills was nonsense and supererogatory, because the Pyramid hill could furnish plenty of the same sort ; and of others, that there had been no large amount of building of any kind, because the Pyramids were merely hills trimmed down where they stood.

But errors, as well as truths, have much vitality ; and this last notion has recently been produced again with such effect, as to have appeared in more than one shapely book ; and not unfrequently to have been flung at ourselves in conversation, as being something we could not gainsay. An eminent contractor for the execution of first-class earth engineering works, has recently declared—so these authorities aver—that the Great Pyramid ‘was never constructed,’—a sounding phrase, even a signal flag to fight under ; and meaning, the technicality of the words being interpreted, that the Pyramid was not built by masons, but banked up or dug away by navvies and quarrymen.

Well, the engineers of the present day, and contractors too, are a wonderful class ; and have a right to be heard on the *modus operandi* of ancient works, either of architecture or engineering. But what are the proofs of their new battle-cry, ‘The Great Pyramid was never constructed’?

These two, according to themselves—1st, the ground around the Pyramid *looks* as if it had been

excavated ; and, 2d, one of these able contractors who has been twice to the Pyramid, and spent about three hours there each time, 'is certain that the ' ancients had no machines by which they could have ' lifted such large stones.'

'Is he a well-read man in ancient architectural literature ?' asks an onlooker.

He himself says, 'Oh no ! not at all ! He never ' reads a book in any language.' And when referred to the Pyramid's side, where he may see the masonried stones up on high, actually lifted, no matter how it was done, but as a proof it was done,—he replies, 'that is only apparent, not real, building ; ' the stones were cut into shape on the ancient hill- ' side up there, and left as we see them now. And ' he will not acknowledge any difference between ' the dense limestone from Mokattam, and the friable ' nummulitic limestone of the Pyramid hill ; free- ' stone all of it, he roundly declares.'

His questioner then began with an argument of power :—'You say those stones on the Pyramid ' side were not lifted up there, because no machine ' known to the ancients was strong enough to lift ' such heavy blocks ; and as they are of limestone, ' and the whole hill is of limestone, you hold they ' must have been portions of a high original hill ' trimmed into shape *in situ*. Vastly bigger, how- ' ever, and heavier too, than any of these limestone ' blocks you see,—are the granite blocks in and about ' the King's chamber ; and as they could not have

‘formed part of a limestone hill, they must have
‘been lifted up by human agency to occupy their
‘present well-built, and well-devised, positions. So,
‘if the heavier blocks were lifted, why not the
‘lighter?’

But this pointed shot fell harmless off the contractor, like a mustard-seed from the sides of a rhinoceros; for he answered with amazing *aplomb*,
‘That’s not granite at all in the King’s chamber, it’s
‘all concrete,—a mixture that was carried up in
‘little basketsful at a time, and then cast in a mould.’

‘Not granite!’ gasped the questioner; ‘why, look
‘at this specimen of the mineral: it was picked up
‘outside the Pyramid, as being almost exactly of the
‘same order as the walls of the King’s chamber!’¹

‘Oh! that’s granite, of course,’ said the contractor, taking the specimen in his hand, and turning it over and over jauntily; ‘but that’s not the walls of the
‘King’s chamber. Have you seen Pompey’s Pillar
‘at Alexandria? No, you haven’t. Well, I thought
‘so; and it’s a pity you haven’t, because there you
‘would find the whole thing most completely proved
‘to your own and everybody’s satisfaction. There
‘are some marks made on Pompey’s Pillar by cannon-
‘balls at the siege; and wherever one of them has

¹ Neither in this conversation nor elsewhere in this work, have the mineralogical differences of granite, syenite, and syenitic-granite been taken into account; for, as regards architecture, granite is the well understood term that includes all three; and all three are, for the purposes of a mason, so nearly similar to each other, and entirely removed from soft limestone.

‘struck and torn up the surface, you can see quite
‘plainly that it’s all concrete inside, and nothing
‘else. All cast in moulds; though men who look
‘at the outside only, are always raving about the
‘beauty of the *granite* shaft, forsooth!’

‘And you formed all that idea for yourself,’ asked
the other; ‘didn’t get it out of any book?’

‘Haven’t I told you I never read any books?’
returned the contractor.

‘Yes, I remember now, that you said so,’ replied
his questioner; ‘but it is so very strange to find an
‘old idea exactly repeated in modern times. For
‘this is how a writer expresses it in 1702; the
‘quotation beginning at the middle of a paragraph
‘at the foot of page 202, thus—

“The only entire pieces that have escaped the common fate
‘of the rest, are the column of Pompey, and four obelisks of
‘granite. ’Tis said the first was erected by Cæsar, to the
‘memory of Pompey: some think it a kind of *marble*, but others
‘incline rather to believe that ’twas built of *melted stone*, cast in
‘moulds upon the place. The latter opinion seems most pro-
‘bable, for there is not the least piece of that stone to be found
‘in any part of the world, and the pillar is so prodigiously big and
‘high, that it could hardly be erected without a miracle. I
‘know ’tis alleged by those who believe the story of the Rhodian
‘colossus, that the ancients had the advantage of admirable
‘machines to raise such bulky pieces; but I should reckon my-
‘self extremely obliged to these gentlemen, if they would show me
‘any probable reason why among so great a variety of Egyptian
‘monuments of antiquity there is not one of *marble*; and by
‘what unaccountable accident the stone called *granite*, which
‘was then so common, is now grown so scarce, that the most
‘curious enquiries into the works of nature cannot find the least
‘fragment of it, that was not employed in ancient structures.

‘ And even though I should suppose, with my adversaries, that the quarries out of which this stone was dug were by degrees so entirely exhausted, that there is not the least footstep of ’em left; and that Nature herself has lost so much of ancient vigour and fecundity, that she is not able to produce new ones; I may still be allowed to ask why granite was only used in obelisks or columns of a prodigious bigness: for if it were really a sort of stone or marble, I see no reason why we might not find small pieces of it, as well as *porphyry*, and other precious kinds of *marble*. These reflections, in my opinion, may serve to confirm the hypothesis of those who believe that all these admirable monuments were actually cast in a mould: and if they would take the pains to view this column attentively, they would soon be convinced by the testimony of their own eyes, that ’tis only a kind of cement composed of sand and calcined stone, not unlike to mortar or lime, which grew hard by degrees. I will not pretend to determine by what artifice these ancient workmen kept the cement from yielding or sliding till the pillar was completed; though perhaps it might be probably alledged, that they made a mould of stone or wood, besmeared on the inside with some fat or unctuous substance, to hinder the matter from sticking to its cover; and that after the work was finished, and the column almost dry, they broke the mould that preserved the regularity of its figure, and kept it from falling.’

‘ “ This column is 80 foot high, and 24 in compass: ’tis placed on a marble pedestal eight foot square, and crowned at the top with a chapter of the same *granite*, of which the pillar consists. I know not what opinion you may have of the ancient engines, but for my part I must confess, whether I consider the weight or bulk of so vast a mass, I find it equally impossible to conceive that it could be raised by the strongest and best contrived machines that were ever invented.” ’

‘ So there,’ continued the questioner to the modern engineering contractor, ‘ you have, in a book printed 164 years ago, your own theory of the easy formation of granite in moulds (only you must remember to grease them well inside), and a disbelief in the power of ancient machines to raise

‘ large stones ; and all this in reference to the well-
‘ known and frequently-visited Pompey’s (Diocle-
‘ tian’s) pillar. A thing, not secluded in a dark room
‘ of difficult access, like the King’s chamber in the
‘ Great Pyramid, but standing out in the open sun-
‘ light, in a sea-port town, appealing to all observers ;
‘ and those curious inquirers, would therefore have
‘ long ago found out, and made patent to all the world,
‘ such a flagrant case of cheating ; or, if you like, such
‘ a splendid invention for imitating granite,—had it
‘ really been as represented. But I rather incline
‘ to think that the true difficulty to man, is not the
‘ mechanical exertion of lifting a heavy stone when
‘ you have got it,—but competing with Nature in
‘ *making* a natural rock. The idea, however, that
‘ men could do so, seems to have prevailed rather
‘ extensively at one time, and has led to the ill-
‘ treatment of other monuments besides the King’s
‘ chamber and coffer of the Great Pyramid ; for
‘ thus the worthy Dr. Stukely is compelled to write
‘ about Stonehenge, in 1740 A.D. :—

‘ “ Nevertheless the current of so many ages has been more mer-
‘ ciful to Stonehenge, than the insolence of rapacious hands (besides
‘ the general soccage brought upon the work of old) by the unac-
‘ countable folly of mankind, in breaking pieces off with great
‘ hammers. This detestable practice arose from the silly notion
‘ of the stones being factitious. But alas ! it would be a greater
‘ wonder to make them by art, than to carry them sixteen miles
‘ by art and strength ; and those people must be inexcusable,
‘ that deface the monument for so trifling a fancy.” ’

Exterior Substance of the Great Pyramid.

Portions of Great Pyramid casing-stones which we have placed in the hands of a lapidary, have not come up to the polish of 'marble,' only to that of moderately hard limestone; yet it is a nice and pleasant species of worked stone to handle, uniform in its structure, of small specific gravity, of a warm and rather more than a *cream-colour* in tint, and with a great adaptability to cut up into accurate mathematical figures, of any angle.

But the ancient *exterior* surface of these specimens is found, in nine cases out of ten, to be of a rich brown hue, the exception being a pale blackish tint; and underneath the brown colour, a thin film is sometimes perceivable, rather whiter than the rest of the stone. Altogether, the brown tint has been taken by many persons as the remains of paint or 'shellac varnish;' and as a proof of the *lubrication* of Pliny, meaning some unctuous coating applied to the stone; though others translate the word as merely polished, and consider it to imply that sort of polishing which results from grinding, or other mechanical smoothing process.

Dr. Wallace, of Glasgow, however, has found (vol. ii. Sect. v.) the brown material to be oxide of iron, and considers it to be an exudation from the stone. This suggestion, too, explains the similar browning which is found over all the tops and external sides of most of the stones forming the present

summit of the Great Pyramid ; stones from Mokattam in every instance there, though never on the ancient exterior surface of the Pyramid ; and therefore never in a position to get part of a coat of paint once spread over the bevelled outside, if such a coating was ever really applied.

The development, however, of this outward iron-browning, would seem to require a long exposure to sun and air ; for however much of it there may be on the bevelled, and therefore ancient, outside of an ordinary casing-stone fragment,—there is none on the same fragment's own adjoining surfaces, *if* they formed any part of the course of masonry, and were in so far in an interior position. Every chipped or scraped surface of any of the stones still standing *in situ*, as those about the entrance to the Pyramid, is furthermore lighter and lighter in colour, according to the recentness of the scraping. A matter abundantly provable by the dates attached to the names of travellers, in the label spaces which they have often prepared for themselves by scraping ; and which, in photographs of the cyclopean blocks placed *en décharge* over the entrance,—appear like so many white paper patches on the brown stone ; while Dr. Lepsius's inscription to the late King of Prussia, looks like the large advertising-bill of some unscrupulous trader. The untouched parts, therefore, of these inclined blocks, are decidedly brownish ; and if not of the full casing-stone, or topmost stone, hue,—it is because they have not the same unmiti-

gated exposure to sun and wind, on account of their position in a hollow on the northern side of the Pyramid ; and it was on that flank of the building alone, that several casing-stone fragments were found by us with their original outside surface, occasionally, not brown, but pale black. Another exudation of the stone, however, there is, which seems notably to require darkness, quiet, and *want* of change of air for its manifestation, viz., the salt.

Salt inside the Pyramid.

This substance is so abundant, *i.e.*, in dense plates, an inch thick often, in the horizontal passage and Queen's chamber,—and so scanty everywhere else,—that the Arabs believe, both that it exists nowhere throughout the Pyramid except in these two named localities ; and that it is to be found there, simply because the builders put such 'salt stones' into that particular department of the building. Yet there are incrustations of salt in large superficial extents, though to small thickness, developed on the walls of the Grand Gallery.

Similar incrustations, too, are to be seen on the horizontal part of the entrance passage and the walls of the sepulchral chamber of the *second* Pyramid,—though greatly reduced from their appearance when Belzoni entered it, some seven hundred years after its last mediæval visitors had left ; for he then found incrustations, or rather exfoliations, more like 'endive leaves, and several inches long,' where now

they are ~~can~~ be measured only by tenths of inches. Yet in every case, the material comes out of the wall with curving fibres, as if it were a viscous substance forced out through small apertures with enormous pressure; and it is still coming out, as proved by its decorating recent scratched figures. This fibrous aspect, appears to have been well noticed by Mr. W. R. Wilde,¹ who, speaking of similar saline formations in the chambers of construction in 1837,—or the very year of the discovery of those rooms by Colonel Howard Vyse, and therefore before they were blackened by the smoke of visitors' torches,—describes what he saw as 'a remarkable incrustation of a shining white, curly, and crystalline substance, not unlike the moss called *ursnea barbata* covering some of the trees in Madeira. It is found in little bunches on the roof, and as it is a substance, not, that I am aware of, as yet accurately described, being generally supposed to be nitrate of potash or saltpetre, it has been subjected to chemical analysis by my friend, Professor (since Sir Robert) Kane, and found to be common salt, *chloride of sodium*. He states to me that its occurrence in this form is of considerable interest, as it illustrates the manner in which some species of the alum family assume the curious fibrous and contorted figure of these specimens. A question of exceeding interest here presented itself,—how did it get

¹ *Narrative of a Voyage to Madeira, Teneriffe, etc.* Dublin, 1840.

‘ into and crystallize on the sides of these ^{old} chambers ?
 ‘ Three modes of resolving the problem ^{have} oc-
 ‘ curred to me : either that the granite (?) itself
 ‘ was filled with this substance in its original bed,
 ‘ and that it oozed out and crystallized in this
 ‘ curious form afterwards ; or that the atmosphere
 ‘ from the desert, where salt is found (as it is in
 ‘ the neighbourhood), becoming impregnated with
 ‘ fine and impalpable saline particles getting into
 ‘ the interior of the Pyramid, so encrusted it as I
 ‘ have described, although we know that for cen-
 ‘ turies there was no apparent inlet for it ; or,
 ‘ thirdly, that it was used in some of the mystic
 ‘ rites that were of old practised in the lower
 ‘ chambers, and, being carried up in the form of
 ‘ vapour, cooled and crystallized in the upper apart-
 ‘ ments. But, at the same time, I must acknow-
 ‘ ledge that none of these modes satisfy me as to
 ‘ the way in which this salt was formed.’

That the salt is almost entirely common salt, or *chloride of sodium*, Dr. Wallace’s recent analysis confirms the older ; and that *one*, if not the only, origin for it, is its original presence in the material of the Pyramid (not the granite indeed, on which I have never seen any trace of the salt, but the lime-stone),—is also shown by his analysis of the nummulitic lime-rock of the Pyramid hill, and the shell limestone of the southern hill : as well too as by my own late finding, that the recently cut and polished specimens of the Great Pyramid casing-

stones, after being put away for a few months in a closet, are quite salt to the tongue.

But *that*, I must confess, does not of itself explain why there should be twelve times as much salt found in the construction of the stone forming the lining of the Queen's chamber, as in any other part of the Pyramid, or Pyramid hill, yet examined. So that the question may still be opened up, as to whether the Pyramid builders used this *very* salt-stone for the Queen's chamber and its passage, through accident, or design. Unless the following suggestion should be deemed of weight, viz. :—That there is a tendency of the salt contained in all the mass of the Pyramid, to crystallize out towards, and into, any internal void ; and that the product goes on increasing therein, if there be no *ventilation*. Coincidentally with which idea, it should be remembered, that the Queen's chamber is absolutely without visible ventilation,—forming, as it does, a *cul-de-sac* out of the line of the passage leading to the King's chamber, with its peculiar air-tubes ; the Queen's chamber, moreover, being conspicuous in most travellers' accounts from the time of Sandys and Greaves downwards, for its 'noisome savour and 'grave-like smell forcing a quick retreat.'

Mortar of Great Pyramid.

From a paper,¹ by William Wallace, Esq., Ph.D., of Glasgow, to whom two specimens of Great Pyra-

¹ *Chemical News* for April 1865, p. 185.

mid mortar, one from the interior, the other from the exterior of the structure, had been furnished by William Clarke, C.E.—the following analysis is taken :—

	Interior.	Exterior.
Sulphate of lime, hydrated,	81.50*	82.89*
Carbonate of lime,	9.47	9.80
Carbonate of magnesia, . . . . .	.59	.79
Oxide of iron, . . . . .	.25	.21
Alumina,	2.41	3.00
Silicic acid,	5.30	4.30
	99.52	100.99
* Water by actual estimation,	16.66	17.38

Both varieties of mortar being described as appearing, 'a mixture of plaster of a slight pinkish colour, 'with crystallized selenite or gypsum,'—I should be inclined to say, that Mr. Clarke had not secured any of the more precious *milk-white cement* of the finishing blocks of the interior,—but only some of the ruder cement of the masonry courses. This, too, is the same in every part of the Pyramid, and has just the pink aspect ascribed to it, together with a variety of little particles and lumps,—all under the size of a small pea; and in colour, chiefly brown, red, and white. A portion of this sort of mortar, of my own gathering, which I recently transmitted to Dr. Wallace, he describes as identical, chemically, with what he had previously examined.

Hence the above analysis represents the mortar of all the chief mass of the Great Pyramid structure,

and shows it to be different from ancient Phœnician, Greek, and Roman mortars,—perhaps all mortar, in consisting almost entirely of sulphate of lime; and having little or nothing of the carbonic acid with lime, silicic acid and sand which abound in *them*. This characteristic fact of Pyramid mortar seems to have been first discovered by Dr. Wallace, through means of genuine chemical examination; and appeared to him so unusual, that he was not a little interested to receive from me *afterwards* some specimens of rock, as well as loose crystals picked up near the Pyramids, and which he then ascertained to be ‘sulphate of lime, *very pure*.’

Diorite.

The stone which I have called *diorite*, and which Dr. Wallace looks on rather as a ‘*hornblendic quartz-ite*,’ is apparently the same as that forming the statue of King Shafre in the Museum of Boolak; and is abundantly distinguishable to the most common observation from the black or blue basalt, and greenstone of all varieties in size of grains, found lying in fragments on various parts of the Pyramid hill. But it is the occurrence of chips of the diorite (?) amongst the ancient rubbish north of the Great Pyramid, to which I would now call attention,—for no presently existing part of the Pyramid is constructed in this material; and there is much uncertainty as to whence so remarkable a mineral was brought.

The Arabs always say, with every strange stone

they are asked about, 'From Upper Egypt;' but I have not met with a single man, either Arab or European, who has seen it there *in situ*; and the coloured plates of minerals from Assouan in the great French work, do not contain anything at all resembling it; so that the question would seem to be still an open one.

There are likewise, some similar questions, yet to be settled finally, as to the Sinaitic or Syene-itic derivation of the Great Pyramid's red granite.

Granite.

Hence, a little more about *granite*, but upon a new accusation, must really be requested of our kind reader's patience. The extract which we formerly gave, p. 90, indicates the scanty knowledge of this lordly mineral possessed by Europeans in recent ages; and the mystical impossibilities, therefore, attached to it. In the present day, when the quarries of Aberdeen and St. Petersburg have enabled all men to talk quite glibly about 'red granite,'—even 'as maids of thirteen do of puppy-dogs,'—we are rather surprised at the laborious phrases with which the learned Dr. Clarke found himself obliged to convey to his readers, of only sixty years ago,—a notion of the sort of substance he was speaking of; but had to make plain to them in the following round-about manner:—'By *Greaves' Thebaick marble* 'is to be understood that most beautiful variety 'of *granite*, called by Italian lapidaries, *granito*

‘ rosso (see Forbes’ *Travels*, p. 226, London, 1776),
‘ which is composed essentially of *feldspar*, of *quartz*,
‘ and of *mica*. It is often called *Oriental granite*,
‘ and sometimes *Egyptian granite*, but it differs in
‘ no respect from *European granite*, except that the
‘ red *feldspar* enters more largely as a constituent
‘ into the mass than is usual in the *granite* of
‘ *Europe*. The author has seen *granite* of the same
‘ kind, and of equal beauty, in fragments, upon the
‘ shores of the Hebrides, particularly at Icolmkill.’

Yet, was Dr. Clarke quite right in his day, to take so much pains ; and had he lived now, he might not have found his task everywhere quite finished ; for thus, an English visitor,—a graduate of the University of Cambridge, and bearing a name respected in science,—remarked to us in our dining-room tomb, at East Tombs, Pyramid hill, with the petrified nummulites staring him in the face,—‘ What an interesting *granite* cave you are ‘ living in here !’ And again, divers recent travellers have spoken of the entrance passage of the Great Pyramid, being *lined with granite* ; when there is nothing but soft limestone there to be seen. The excuse may perhaps be made for these gentlemen, that they did not try the hardness ; and only looked at a distance to the corrugated surface of weathering, more or less blackened by smoke, and rubbed for ages on the points of the corrugations by passing Arabs in greasy clothing ; which gives occasionally, with the assistance of chance drops of wax from

flaring candles, a very peculiar mottled appearance.

What shall we say, however, of a literary man, who has been often and long in Egypt,—has written many books upon it most learnedly; has excavated at the Pyramid hill; and, through means of broken pieces of the limestone, has seen beneath the corrugated, parti-coloured exterior surface,—witnessing there only the soft, white, uniform powdery character of the interior of Mokattam blocks,—and persists, nevertheless, ‘that it is all granite!’

‘Impossible!’ might any one well exclaim; and yet here is the fact:—

‘Another point also regarding the Pyramid of Suphis, seems to require explanation. It is the generally received opinion, that the Pyramid was originally covered with a casing. . . . The researches of Colonel Vyse, and Lepsius, led them to the conclusion, that the casing-stone was of limestone of Tourrah (Mokattam). We are compelled to say that such is not our impression. In the course of repeated visits to Jeezeh, including a residence there for a time, it occurred to us, that the casing had been removed from the Pyramid of Suphis at a very early period, *long before the days of Herodotus*,’ etc. etc.

‘We were induced by this consideration, to examine the mounds of detritus, which everywhere, and to an enormous depth, encumber the platform of rock on which the Pyramid stands. We found they were composed all but entirely of fragments of a grey granite, identical in appearance with that which lines the inner passages and vaults. It was this circumstance which forced upon us the conclusion, that the outer casing also had been of the same material like that of the third Pyramid. This granite was obtained, not from Syene by the Cataracts, but from the Peninsula of Sinai. Accordingly Herodotus tells us that Cheops brought the stone with which he covered the Pyramid, from the mountains of Arabia; an epithet not ap-

‘plicable to the limestone hills of Tourrah, which everywhere
‘overhang the Nile, and do not reach so far either northward or
‘eastward, as to be with any propriety entitled to the name of
‘Arabia.

‘The casing of the Great Pyramid, then, was of grey granite,
‘a material not to be found anywhere either in Lower or Middle
‘Egypt, or their vicinity; and, therefore, very valuable in that
‘country, because brought thither from a great distance. It
‘served for a series of ages as the granite quarry of Heliopolis,
‘Memphis, and other cities in the vicinity. It is, we submit,
‘thus, and thus only, that we can account for the entire and
‘early disappearance of the casing, and also for the vast and
‘deep *couche* of granite detritus which surrounds the Pyramid.’

Now this author, is no other than William Osburn, member of the Royal Society of Literature; and the work quoted from, his *Monumental History of Egypt*, published in 1854, in two large volumes octavo,—containing unitedly more than a thousand pages, and filled for the most part with admirable investigations and disquisitions concerning the interpretation of hieroglyphics, and their application towards elucidating the early history of Egypt. Even in this passage, too, the author shows his perfect honesty and loyalty, in openly stating at the beginning, that the testimony of two such weighty authorities as Colonel Howard Vyse, and Dr. Lepsius, is dead against him. What, then, can we think of this formal declaration on his part, of grey granite in place of white¹ limestone?

At first, I hoped there might be some explanation under the cover of the word ‘grey;’ which may

¹ Dry oxidated fragments seem to lose their cream-colour, and form powder as white as flour.

mean, according to the speaker, almost anything from white to black. But on p. 271 of his volume i., the following words of the same author settle that point,—when we know of how dark a chocolate colour, nearly black, the coffer of the Great Pyramid is,—‘The whole interior cased with grey granite, and ‘the square inscriptionless sarcophagus of the *same* ‘*material*.’ Hence, the *colour* also, which Mr. Osburn assigns to the fragments forming the hills of rubbish outside the Pyramid, and lying against the sides of its base,—is as totally different from what we found it, and our photographs represent it,—as are their material and mineral characters.

What, then, are we to do with Mr. Osburn’s book? Are we to throw it altogether away from us, as undeserving of any confidence, because it has this flagrant error in a single simple matter? No, certainly; not on that account, according to any principles of common justice: for there is no one who has written yet on the Great Pyramid, who has not blundered at some one point or other. And when the writer has been a great man,—say a French Academician, for instance, writing down the depth of the coffer three whole inches too great,—the world has not ceased on that account to continue to pay such great man adulation, and believe in all the rest of his writings as before; especially if the slip should have occurred in something that was not his *forte*, or his usual subject of pursuit.

Now the latter characteristic appears to have been precisely that of Mr. Osburn and mineralogy ; for his main subject is hieroglyphical interpretation, and there he seems even to be a giant.

But his case, as already intimated, is not a solitary one ; and the records of Great Pyramid investigations (as these volumes will probably indicate before they are concluded), contain instances numerous and striking enough,—either to destroy all faith in the testimony of man, and to confound any computer of mathematical probabilities,—or, to lead to the institution of new inquiries on the admission and weighing of evidence : either one result, or the other, according to the nature of each recipient's mind.

PROPOSITION IX.

ORIENTATION OF THE GREAT PYRAMID ?

ALTHOUGH some features of this question have been touched on in previous pages, yet for the sake of condensing all the information and depositing it in a part of our work appropriate for the purpose, and easily referred to,—we beg to wind up our *phenomenal* Division I., with a few remarks on this important question of astronomical emplacement.

A Pyramid would evidently still be a Pyramid, towards whatever quarters of the horizon the sides

of its base were pointed. But something may be added to its other meanings, if one particular direction has been selected with some trouble, out of all other possible ones. And that seems to have been the case not only with the Great Pyramid, but with all the other Pyramids, and most of the monuments round about it; even down to the small sepulchral square-shafted wells,—for their sides are always approximately north, south, east, and west.

This is a direction peculiar, apparently, to the Egyptian monuments; for the Rev. G. Rawlinson, in his *Ancient Monarchies*, describes all the earliest of the Chaldean temples (and he would place some of them synchronously with *our* date of the Great Pyramid), as having, not their *sides*, but their *angles* pointed to the four astronomical quarters.

With the Egyptian structures, again, their sides are directed, not towards those points of the *compass*,—as runs the prevalent idea of many existing men,—but according to the azimuthal direction of the earth's axis, and a line at right angles thereto. What the direction of the compass was at the Great Pyramid four thousand years ago, probably the man amongst us best versed in the theory of terrestrial magnetism, and the rate of movement of the magnetical poles,—would avoid any attempt to calculate; but at present the north end of the needle on the Pyramid hill, inclines some 10° towards the west; and as all the larger monuments are within, and much within, *one* degree of the astronomical or

earth's axis direction, we need not allude to the compass again. Neither is there occasion to refer to the smaller constructions; for, unavoidable tear-and-wear on the stones composing them, has made it impossible—with their short radii—for modern observation to determine, whether they are, or ever were, once so remarkably accurate as the Great Pyramid has been lately proved to be.

Many celebrated travellers and competent men, take the Viscomte de Rouge for an example, have spoken with admiration of the Pyramid's 'astonishing justness of orientation;' and the Egyptian astronomer, Mahmoud Bey, has described interestingly that when he mounted, on the evening of March 21st, 1862, shortly before sunset, upon the eastern end of one of the courses of masonry on the north side of the Pyramid, immediately above the rubbish-mound,—he saw the sun apparently descending vertically just on the head of his friend, whom he had placed at the western end of the same course. But as these verbal terms of laudation may yet include anything under half a degree,—the result of M. Nouet, Astronomer to the French Academicians in 1799, giving the instrumental error of $19' 58''$ for the north end towards the west,—may be taken as closer; and was even thought very close, by the Academy. (See p. 44.)

My own measure, too, of the north and south azimuth trenches, giving $19' 14''$ in the same direction,—looked very much like a confirmation of M.

Nouet, touching the amount of error in the Pyramid as now existing. But on afterwards measuring the traces of the *original* Pyramid, and comparing them directly with the Pole-star, there were obtained for the error westward (vol. ii. pp. 190-195)—

Of the north end of the line of the outer corners of north-east and south-east sockets, west of north, . . .	+ 4' 44"
Of west end of the line of outer corners of north-east and north-west sockets, + 90°,	+ 4 0
And of north end of entrance passage from under granite portcullis to mouth,	+ 5 0
Mean,	<u>= + 4' 35"</u>

Now this is a remarkable result, not only for the very great proportional amount of reduction in the instrumental error previously believed in,—but in the consistence of all three parts of the Pyramid ; so that none differs more from the mean, than 35". Notable enough is this angular agreement if found in *any* part of the Pyramid ; and capable of proving, on former experience, that the builders must have attached extreme importance to the feature ; but still more notable is it, when the greater difficulties of astronomical, over geometrical or mechanical observations are taken into account. All three angles may, however, be merely geometrical deductions from one and the same original astronomical observation ; and which, if it did in this case turn out + 4' 35",—might, on a second attempt being made, have given —4' 35", or some other largely different quantity.

There is, however, as I have proved to my cost,

so much difficulty in comparing the inclined and high entrance passage with any side of the Pyramid's base,—that I am rather inclined to think that two astronomical references by the builders are included in these three given features of the Pyramid. And the only constructional or pyramidally learned way that remains to mankind, of obtaining more evidence on the subject, is, to compare the Grand Gallery with the celestial Polar direction; for the error in that admirable and gigantic piece of construction we may safely assume, as detailed on pp. 39 and 60, to be less,—probably much less,—than 2'.

But how to compare the Grand Gallery with the stars? At present, the three long cork-like blocks of the granite portcullis in the first ascending passage, stop the way. They cannot be pushed downwards into the entrance passage and so got rid of, because the passage tube into which they fit, contracts below them. But could they not be pushed upwards, and southwards, by a hydrostatic press acting against the floor of the entrance passage?

There would be the friction of long-cemented sides to overcome, as well as the weight of the blocks; and besides that, the performers would have to consider whether, looking to the rudely and cruelly broken-out cavern of Al Mamoon's hole close by, the masonry about the portcullis region might not collapse, when the support of its blocks shall be gone. In fact this eventuality looks so probable, that I myself having seen the place, would

only now venture to propose,—that a round hole be bored through the portcullis blocks *in situ*, so that they might be observed through, and no more. Either such an operation ; or, an attempt by three observers and three theodolites, worked simultaneously,—one in the entrance passage, one in Al Mainoon's hole, and one in the first ascending passage,—to carry the angle *round* the portcullis blocks. But there is doubt, if this last operation could be conducted with the requisite amount of nicety. And even if it was ; and if those who were engaged in its performance, fully believed in the excellence of their own work,—would it equally command the same confidence from the rest of the world,—that a direct comparison of two signals at either end of the Grand Gallery on one side, with the Pole-star on the other, would be pretty certain to receive ?

DIVISION II.

OBJECTS OF CAUSATION. .

VOL. III.

H

*' Whenever any material step in general knowledge has
' been made,—whenever any philosophical discovery arrests
' our attention, some man or men come before us, who have
' possessed, in an eminent degree, a clearness of the ideas
' which belong to the subject in question, and who have ap-
' plied such ideas in a vigorous and distinct manner, to
' ascertained facts and exact observations.'*

REV. WILLIAM WHEWELL, M.A.
History of the Inductive Sciences, p. 9, Vol. i., 1837.

THE GREAT PYRAMID AS A METROLOGICAL MONUMENT.

INTRODUCTION.

AFTER having shown in the course of Division I., the Great Pyramid's striking regularity of figure, perfection of workmanship, and close fulfilling of the requirements of a particular geometrical construction, touching some of those very fundamental matters,—we are called on now to take somewhat higher ground: and, while discussing still further details of mere measures made with care on subsidiary features of the monument,—to endeavour to ascertain how far the numbers given by observation either confirm or refute, certain well-known and long-expressed opinions before the world,—respecting the *reasons* for such and such lengths, breadths, or angles having been given to particular parts.

From the time of Herodotus downwards, or for more than two thousand years, men have been accustomed to talk of the Great Pyramid, and indeed all the Pyramids, as tombs of kings or persons

of kingly race. That is, most men of West-European civilisation have done so ; for in the East, there seem always to have been traditions of an opposite character ; or as to something connected with science, religion, or wealth, being locked up for future generations, and more remarkably in the Great Pyramid than in any other. Within the past two hundred years, however, this last form of belief has gained many supporters both in Great Britain, on the Continent, and in America ; gradually assuming with them the shape of a settled hypothesis,—that somehow or other the Great Pyramid was intended to be a grand metrological, or ‘weights and measures,’ monument for mankind. Not so much though, as a place of frequent reference for those things,—as for preserving safely—during some thousands of years, and through all intervening revolutions of nations, empires, and religious creeds—the grand standards of metrology, true to their original settlement in old primeval times. For they were considered then, as now, to form some of the most necessary material means of civilisation : yea, even ‘the very rules ‘whereby all men’s rights and properties are set ‘forth, distinguished, and valued, the alteration ‘whereof might bring much inconvenience, without any prospect of advantage ;’—as an anonymous author on the Great Pyramid wrote, in the year 1706.

The first dawn of this view in English literature, is probably contained in the works of Bishop Cum-

berland of Peterborough, A.D. 1685 ; though it there takes little other form than assuming, that the several parts of the Pyramid were regulated in size, according to convenient even numbers of local standards of measure then existing. But the subsequent anonymous author above quoted, pronounces boldly for the object of the Pyramid's erection having been to supply,—or commemorate through all time what was once supplied,—to the various *origines* of mankind, as their several weights and measures ; without, too, having any special connexion with what might be in vogue amongst the Egyptians in particular. And after having shown, but in a manner which he himself allows is rather obscure, and which I must confess myself unable to follow satisfactorily—that some early Saxon measures were represented by certain proportions in the Pyramid,—he more emphatically adds, ‘and if we ‘consider the standards of our *English* measures here ‘found, which you have seen, and the standards of ‘such ancient *Persian*, Grecian, and Roman measures, which you will see if you please, you will ‘find it very hard to conjecture that they were all ‘in use amongst the Egyptians.’

A second edition of this curious and most ingenious treatise was published in 1745 ; and states in the title-page, equally with its predecessor, that the author was Mr. John Greaves, ‘Astronomy Professor at Oxford.’ But he died in 1652, and there is no trace of the work having existed before 1706 ;

and though his, Professor Greaves', measures at the Pyramid, in 1637, are the things founded on in conducting the investigation,—the conclusions, particularly the date of the Pyramid's building, are directly opposed to his acknowledged publications on the subject.¹

Metrological purposes for the Great Pyramid were also maintained in France by M. Pauton in 1780; and by M. Romé de l'Isle in 1789: were much alluded to by the French *savants* in Egypt in 1799: resumed again in England by the Rev. Thomas Gabb in 1806 in his *Finis Pyramidis*; and finally published on by the late John Taylor in 1859 and 1864.

¹ The title-page of the above work runs thus:—

'The Origin and Antiquity of our English Weights and Measures
' discovered by their near Agreement with such Standards that
' are now found in one of the Egyptian Pyramids. Together
' with the Explanation of divers Lines therein heretofore
' measured.

' By MR. JOHN GREAVES,
' Astronomy Professor at Oxford.

' As also; Some Conjectures concerning the Time when these
' Pyramids were built; in Answer to certain Letters, etc.

' London: printed for G. Sawbridge at the three Flower-de-Luces
' in Little Britain. 1706.'

While in Professor Greaves' own works, collected by Dr. Birch, besides his own opinions, the following likewise appears, being quoted apparently with honour:—

' For my singular good friend, Mr. John Greaves.

' SIR,—I am more indebted to your affections, than to your judgment in making me a censor of your learned piece. It had not peradventure been much amiss, if you had been so far at cost as to have afforded us a particular topographical map of the place where these
' *innane substructionum moles* stand. For by that we might have been
' able the better to have judged of the discourse of a learned gentleman of Bavaria, *Johannes Fredericus Herwart*, who in the twentieth

Some other authors probably should be mentioned as having written with similar views ; but I have not met with any of their theories, either so original in their nature, grand in conception, or whose numbers come by any means so close to the best Pyramid measures, as do the late John Taylor's ; and that sort of numerical agreement is, in so far as it exists at all, the main feature which we have to look to in the present department of our work. No apology need therefore be offered, for beginning with John Taylor, and giving his ideas a severer scrutiny than those of any other theorist. Simply, therefore, leaving his numbers to come out of such a trial brighter,

* chapter of his *Admiranda Ethnicæ Theologiæ Mystéria*, endeavours to
* take off from the founders of these stupendous buildings the scandal
* of folly and madness, which in the common judgement of the world
* hath struck upon them ; and would persuade us, that the Pyramids
* are monuments of the singular wisdom of the raisers of them, and of
* wondrous use and benefit to the country, in maintaining the banks
* of that part of the river upon which the city of Memphis stands,
* which otherwise were in danger to be swept away by the unruly
* eruptions of the river, if it were not checkt by these wonderful
* structures. If your leisure will give you leave to write unto me,
* give me your judgement upon that discourse of his. One thing I
* miss'd in your work, which makes me suspect it is not of such
* moment as many report, because I find not that you do it so much
* honour as to name it ; I mean the Sphinx, which is wont to be repre-
* sented unto us in the shape of the head and shoulders of a woman.
* When you list to lose so much time, let me hear from you what you
* have observed concerning that piece, if at least it yielded anything
* worth your observation. Sir, let not the world be deceived in their
* expectations to partake of your collections in your travels. I assure
* myself, that as they will greatly benefit the generality, so will they
* more particularly your true and faithful friend,

' JOHN HALES.'

* From ETON COLLEGE this 18th of October 1646.'

* Commend me to Mr. Pulein, and request him to send me *Philos-
* storgius*.'

if they can,—we shall proceed forthwith to institute such examination, and in as impartial and even unsparing a mood as we can muster for the occasion.

Etymologically, indeed, Mr. Taylor may be wrong, or he may be right, in the Greek derivation of the word Pyramid being, not as hitherto supposed, from *πῦρ*, *fire* (which had made some persons look on monuments of that shape and name as having been erected by Persian fire-worshippers), but from *πυρὸς*, *wheat*, and *μέτρον*, *measure*. Words which might be taken, as designating the primitive purpose for which weights and measures were first employed amongst men ; and some foundation, too, for the popular tradition, so rife in Sir John Maundeville's day, of the Pyramids having been built by Joseph for granaries.¹ Yet it matters little, we say, what meaning of

¹ 'And now also I schalle speke of another thing that is beyonde
' Babyloyne (Babyloyne the lesse, nigh the righte gret cytie of Cayre)
' above the flode of Nyle, toward the Desert, between Afrik and Egipt
' of Canopic ; that is to seyn the grenneres of Joseph, that he let make,
' for to kepe the Greynes for the perile of the dere yeres. And thei
' ben made of ston, fulle wel made of masonnes craft ; of the whiche,
' two ben merveylouse grete and hye ; and the tother ne ben not so
' grete.

' And every gerner hathe a gate for to entre withinne, a lytille
' hyghe fro the earthe ; for the land is wasted and fallen sithe the
' gernerers were made ; and withinne thei ben alle full of serpentes.

' And aboven the Greneres withouten ben many scriptures of dyverse
' langages ; and sum men seyn, that thei ben sepultures of grete Lords,
' that weren somtyme : but that is not treue ; for alle the common
' rymours and speche is of alle the peple there, both far and nere, that
' thei ben the Gernerers of Joseph, and so fynden thei in here scrip-
' tures and in here cronycles. . . . wherefore it is not to believe, that
' thei ben Tombes or Sepultures.'—*The Voiage and Travaile of Sir
John de Maundeville, Kt., A.D. 1350.*

their own language the Greeks put on the word,¹—if its invention was long antecedent both to them and their nation, and had been, as said by some, from the earliest times recognised as a name by the builders of the monument; or in the ancient Coptic language; and as meaning, a 'division into ten; 'from "*pyr*," division, and "*met*," ten.'²

Now this derivation, which we first heard of in Cairo, and have since tested by reference to European digests of the earliest Egyptian language,—is not only connected with the right ethnological quarter,—but is a much wider and more significant appellation for a metrological monument of the most scientific kind, than any of the Greek forms. It coincides too, in some degree, with the leading

¹ From *πυρὸς*, *wheat*, and *ἀμείω*, *to collect*.—*Rees' Cycl.*

From *πυρῶν καὶ μέλιτος*, *a cake of pointed figure, and sweetened with honey, as used in the Bacchic rites*.—Mr. Kenrick and Sir Gardner Wilkinson, in *Ravellinson's Herodotus*.

From the Arabic *ahram*, or *hāram*.

From *perami*, 'lofty;' thought to be the same with the Hebrew *Charaboth*, which in Job iii. 14, obviously signifies 'a sepulchre,' though rendered in our version 'desolate places'.—*Rev. G. Trevor, M.A.*

From *pouro*, 'a king;' and *misi*, 'a race' or 'generation,' in the Coptic language.—*Wilkins, Dissert. de Ling. Copt.*

The name of Pyramid in Egyptian appears to be *br-br*.—*Sir Gardner Wilkinson*.

See also a whole essay on the derivations of the name by M. Jomard, in the great French work.

² The above words in italics are merely written down by us, rudely phonetic, as we heard them. But, on referring to Bunsen's *Egypt's Place*, where no such origin for the word Pyramid is hinted at, and where the Great Pyramid itself is positively claimed for a sepulchral monument only,—we have since found at p. 474 of the Egyptian vocabulary, in vol. i., '*ṖΧr*'=division;' and again, in volume iv. p. 107, in the chapter on Egyptian numerals, '*X* (10)=*Mēt*, *mēt*, Copt.'

mechanical features of the whole Pyramid ; which are,—that it is a mathematical body with five sides (including the base), and with five corners ; or, masonically, five corner-stones.

Hence, if the metrology taught by the Great Pyramid is to coincide, either with its name (where we cannot pretend to be quite certain), or figure (where we are quite certain and perfectly assured of the facts),—we must expect to meet frequently with multipliers and divisors, powers and times, both of ten and five. That is, whenever the subject really admits of such numbers with advantage ; for there are some things to which even decimal division, notwithstanding all its ravishing beauties for many minds, cannot be applied. An example, too, of these inflexible subjects, is held up by the Great Pyramid at once to all men, and at very first sight,—in its vertical height, as compared with the length of the four sides of its base, being arranged with particular care to be in the proportion of the radius to the circumference of a circle ; two things which are incommensurable evenly,—not only in this world, but in every other throughout all the bounds of the Universe.

With this proviso, we proceed at once to consider the several measured features of the Great Pyramid, in an order suited to the heads or principal natural divisions of any large and comprehensive system of Metrology. And in that spirit, have to deal first with—

SECTION I.

STANDARDS OF SIZE.

A COMPLETE system of these measures will evidently embrace cubic and superficial, as well as linear; but the two former being merely geometrical variations of the last,—we have only to employ ourselves, so far as scientific physical standards are concerned, in seeking for those of *linear* measure. Now, such standards have been already looked for by many and many an author, in the sides of the base of the Great Pyramid; even before they knew that the terminal points of those magnificent base-lines, had been carefully marked in the solid rock of the hill, by the socket-holes of the builders. (Vol. i. p. 528; vol. ii. p. 134.)

My own measures of the mere present masonry-courses,—correcting by estimation for the extra breaking away and ruin at the corners,—yielded about 8950 inches for the mean length of one of the four sides of the base, exclusive of the ancient casing and backing stones; and having elsewhere (p. 27), elected to take 101 inches horizontal, for their thickness on one side,—we must add twice that to the above measure,—and accept 9152 inches

as the original length of one side of the base of the finished Pyramid. But this determination is affected by such very large errors of observation (± 50 inches at least) that it is not worth any attention in presence of measures by other men, who have operated upon the actual socket-marks alluded to above.

Now the only man, who ever had the privilege of measuring all four sides of the Great Pyramid's base, between their respective corner-sockets, is my young friend and sometime fellow-labourer, Mr. Thomas Inglis,—representing for the time, Mr. William Aiton, of Glasgow. And he (vol. ii. p. 134), made the

North side,	.	.	.	9120	British inches long.
South	„	.	.	9114	„
East	„	.	.	9102	„
And West	„	.	.	9102	„
				<hr/>	
Mean, =				9110	<hr/>

But the north side had been previously measured between its two sockets, by the first and always to be gratefully remembered discoverers of those sockets, viz., the French mathematicians in 1799; also by Colonel Howard Vyse and Mr. Perring; and finally, by Mahmoud Bey, Astronomer to His Highness the late Viceroy Said Basha, in 1862.¹ Some other names, indeed, might also be given as having measured from the north-east socket,—but their accounts are not quite clear as to what they touched at the north-west corner, where they seem to have

¹ *L'Age et le but des Pyramides lus dans Sirius.* Par Mahmoud Bey. Alexandria, 1865; but based on observations made in 1862.

looked on the stone,—which has merely tumbled by accident into some part of the general area of that socket-hole,—as the true and veritable ancient corner of the Pyramid itself. The sole authorities, therefore, to be quoted, stand as follows :—

	British inches.
North side, by French Academicians in 1799,	= 9163
„ by Colonel Howard Vyse in 1837,	= 9168
„ by Mahmoud Bey in 1862, . . .	= 9162

These look fair enough by themselves,—but what shall we say on comparing them with Mr. Inglis's measure of the same side ; or of the other sides, all between their respective and appropriate sockets ! Closer together are the results, than those of previous centuries, when they are found thus :—

	English inches.
Professor Greaves, A.D. 1637, a side of base of Great Pyramid,	= 8316
Dr. Shawe, . . . 1721, „ . . .	= 8040
Dr. Perry, . . . 1743, „ . . .	= 9360

But a difference of 50 inches in a run of 9100, is far too great to be tolerated in the present day. And yet we suspect it will have to be borne with, until the long-desired opening-up of all four sides of the base, from end to end, shall be performed by some country, or ruler, or people. For, to demand of any single scientific traveller to make a correct measure over the hills of broken stones, as they are now,—is like asking a Londoner to ascertain the horizontal breadth of base of St. Paul's Cathedral, by measuring over the outside of the dome thereof. But the present encumbrances of the ground at the Pyramid, are

modern and factitious ; and the lines whose lengths we require to know there, were not only nicely laid out by the ancient builders on a level surface of rock all the way,—but their terminations were well defined, by having been neatly and deeply cut into the solid rock of the hill. Hence, if modern men have not yet ascertained the true length, it is *their* fault, rather than that of the monument,—that the residual uncertainties we have to deal with, lie among tens of inches, rather than single inches, or smaller portions of space still.

From the numbers actually given above, the probabilities *seem*, that the northern side is rather longer than the others. But that may arise merely from the rubbish-heaps there being, as they undoubtedly are (see Map, Plate III. vol. i.), steeper, more broken, and consequently more difficult to eliminate in their tendency to give an increased length to a superficial, over a horizontal, line. Again, one is almost inclined to fancy that Mr. Inglis's mode of measuring must have had some constant error about it, when all his sides come out so much smaller than one of the sides measured between the same marks by three independent observers. But we are hardly entitled, on that presumption merely, to give his four measures the weight of one only, when taking a mean between him and the other three observers ; nor yet, looking at the natural reason for some such presumption, can we give him the weight of four, where each of three good predecessors are accorded

only one. Allowing him, therefore, the weight of two,—the *mean* of all four observers (which we may after that consider to approximately represent the length of the mean of all four sides of the Pyramid's base), presents the following numbers, viz., 9142 British inches.

Wherefore upon that foundation, derived as it is from the best modern measures yet made, comes the question—What does that definite length of base-side mean, or imply, as a standard of linear measure?

Some men, chiefly hieroglyphic scholars and general antiquaries, looking at the matter too much in an Egyptian point of view,—have pronounced rather hastily for the base-side representing the round number of 400 ancient Egyptian cubits, or of so many of the cubits of Memphis and the Nilometer, even. But as that cubit, according to Sir Isaac Newton, was about 20·7 British inches in length,—and, agreeably with the various examples of it quoted by that very safe authority Sir Gardner Wilkinson, has hardly ever, if ever, been found to vary more than from 20·4 to 21·0 British inches,—and by our own determination (vol. ii. p. 340), was more nearly 20·72 British inches,—that gives a length at the utmost of 8400 inches,—which is totally impossible to receive, in face of 9142.

Next came M. Paucton, in France, with his '*Metrology, or Treatise of Measures, Weights, and Monies, of both Ancient and Modern Nations*,'—a

noble quarto of 960 pages, and he a worthy man, publishing in 1780, with the approbation and privilege of the King. Stating, moreover, on his title-page, that 'God had arranged everything in measure, weight, and number;' and giving on the reverse of title, six memorable quotations from Scripture,—showing that a care for the justness of weights and truth of measures was not beneath the attention of the Almighty in legislating for His peculiar people, and when granting revelations of His will for the instruction of all mankind.¹

After drawing a theoretical picture of what the ancients *might* have done to preserve a knowledge of their measures for posterity,—Paucton takes ground boldly on his page 6, in stating 'that they have at least done what is quite equivalent thereto. For, in the first place, they have preserved their linear measure on a monument as durable as a monolithic rock; and, in the second place, upon a model or type taken from nature, as ingenious and exact as the pendulum itself, viz., a degree of the meridian.'

This idea is further developed in his pages 110 to 116, and mainly depends upon the belief or assertion that—

500 times the side of the base of the Great Pyramid,
or 20,000 times the cubit of the Nilometer,
or 500 times a certain 'stade' measured in 'Laodicea by Mr.
' Smith of London,'

all mean the same thing, or amount to the same

¹ 'Omnia in Mensurâ et Pondere et Numero disposuit Deus.'—Ex Libr. Sapient. xi. 21. Leviticus xix. 35-36; Deut. xxv. 13-17; Proverbs xi. 1; xvi. 11; xx. 10; and xx. 23.

length ; and *that* length is the measure of a degree of latitude ; such degree being, the 360th part of a circle.

Now, as Paucton's Egyptian authorities do not seem to ascend higher than the Alexandrine Greeks, or within some two thousand years of the Pyramid-building day,—we may well ask for some further proof than 'the practice of Ptolemy and Theron,' that the Pyramid builders were accustomed to divide the circle into 360° . But without pressing that point at present, the previous statement may at once be settled—by comparing the attributed equality of the Pyramid bases' side, with 1-500th of *such* a degree, applied to the earth ; for the quantities are by modern measure, Pyramid base side = 9142, and 1-500th of degree = 8750 British inches.

These conflicting numbers are enough, as a late classical friend would have said, to make poor Paucton turn in his grave ; for he had received some travellers' notes in his day, taken without reference to casing-stones or socket-holes either, and making the length of the Pyramid base side = 684.2 *pieds de Rois*, or 8754 British inches. Indeed, he had been cruelly misled about many of the Great Pyramid's proportions ; for, amongst other things, he was made to believe, that the angle of the sides with the base, was $54^{\circ} 44'$; a monstrosity of modern European measure, or guess-work, long since exposed.

A few years after M. Paucton, appeared on the

field, his countryman, M. de Romé de L'Isle, with a *Metrology, or Tables for the Understanding of Ancient Weights and Measures*. But the times had then become troublous and foreboding of evil; wherefore it is almost melancholy to read his touching dedication:—

‘TO MY COUNTRY,

‘being born again under the auspices of Louis XVI., in the year
‘of grace 1789, M. Neckar being Minister of Finance, and the
‘French nation assembled for the restoration of law and public
‘credit.’

In addition to length, surface, capacity, weight, and money, De L'Isle treats very properly of *time* as a necessary part of metrology; and in a rather long Preface, where he has some small faults to find with Pauton's evaluation of Greek measure, he yet lauds his Egyptian Pyramid meridian degree theory to the skies; considers that its original conception ‘has a just title to rank as one of the chief works of the human mind,’ and he would like to see it made the basis of a reform of the French measures. But he does not add anything to Pauton's theory, nor correct his very large errors in the actual size of the Pyramid; and therefore falls irretrievably into the same pit with his unfortunate predecessor,—so far as concerns the explaining wherefore the Pyramid base was made of the precise size we find it to be.

The sage M. Jomard, the principal author of the Pyramidal antiquities, in the great French work detailing operations from 1799 to 1801 A.D.,—is fully

as enthusiastic as any of his predecessors for a metrological meaning in the Great Pyramid,—of which building he has a special Plate, with lines cutting it up for reference to various measures : and to which *one* building he evidently alludes, in sundry rhetorical passages where plural Pyramids are mentioned.

Thus, 'these Pyramids,' writes he (on page 531, *Antiquités Mémoires*, vol. i.), 'to which both ancients and moderns have assigned so many different objects, which have been attributed to vanity by some, to superstition by others, but saluted by all ages as the wonders of the world,—have perhaps served as tombs according to the idea of many authors. But in such case they are the tombs of Princes who either wished or permitted that their remains should attest to posterity the lights of learned Egypt ; and they, the Pyramids, have fulfilled their destination, for they have preserved to us the certain type of the size of the terrestrial globe, and the inappreciable notion of the invariability of the celestial pole.'

From these generalities the learned author advances to particulars, and having Colonel Coutelle's measures of the base along its northern side—from socket to socket—before him,—is too well informed to take either 1-500th or 1-400th part,—but adopts 1-480th of the terrestrial meridian degree of 360° to the circle, as having been *intended* for one side of the Great Pyramid's base. But that result, or 9115

British inches, is neither close enough to the measured quantity to be received as its representative ; nor is any reason whatever given, for introducing such a fraction as 1-480th, into that particular part of the Pyramid.

Next comes before us the Rev. Thomas Gabb, R.C., of Retford, in 1806, with a whole book, and a very well written book too ; but containing only a sort of accidental or relative theory about the Pyramid base's side ; viz., that it was made one hundred times the outside length of the coffer in the King's chamber. Very decided, however, is he on that point, having heard 'such proportion to have been 'ascertained by Bonaparte's *savants* in 1799,' and that they believed said coffer's exterior had been intended by the Pyramid builders as a standard of length. Wherefore Mr. Gabb gladly concludes, that 'that proportion of 1-100th is now most incontrovertibly ascertained ; that the curious granite chest, hitherto incongruously called a sarcophagus, was deposited in its place by the architect himself, who certainly knew it to be commensurate in its length with the side of the external foundations, and did, no doubt, so design it for metrical purposes ; whence it is another illustration of this perfect harmony, this happy, pleasant, useful commensurability of the Great Pyramid of Jeezeh.'

Unfortunately, though, the said coffer, as already set forth in vol. ii. p. 117, is not very regular in external figure ; and, on the mean, only measures

about 89·71 inches in length : and one hundred times that, cannot be looked on as the happy, useful, and perfect representation of 9142.

Lastly, however, comes the late venerable John Taylor ; who, though not a scientific man, yet endowed with appropriate knowledge by his Pyramid literary researches carried on for nearly thirty years, at once transcends in this particular all the most learned geodesists of every age and country : for he teaches us to look,—not at either a degree, or a quadrant, or any other length of any part of the *surface* of the earth,—but to the internal *axis of rotation*, as the one most important linear feature of the whole earth—as well, too, in its abstract physics, as its practical requirements when serving for man's abode ; and more especially in its sufficiency to form, in the best manner, the basis of a grand metrological reference for linear measure.

This position, after its publication, was admirably defended and enforced by Sir John Herschel, in the *Athenæum* for April 1860 ; as likewise was the venerable Mr. Taylor's second enunciation, viz., that five hundred millions of a certain kind of inches,—each of them being ·001 of an inch only, larger than the legalized British inch,—measure the length of the axis of rotation of the earth ; with the full accuracy, moreover, of all the geodesic knowledge yet accumulated by mankind, and whether represented in the latest trigonometrical surveys or the highest

mathematical investigations by the best men in France, Germany, Russia, and England.¹

In so far, then, we have in the 5, with the many 0's that follow it, a Pyramidally commensurable and symbolically appropriate unit for the earth's axis of rotation. But what is the nature of this unit's connexion with the length of the side of the Great Pyramid's base, already assumed from measure, as the rough-looking quantity of, 9142 British inches?

Thus it is that John Taylor proceeds. Referring to Sir Isaac Newton's most remarkable investigations on the length of ancient cubits,²—wherein that gifted author, both shows the Egyptian or 'profane' cubit to have been close on 20·7 inches in length; and equally proves 'the sacred cubit of the Israelites' (a most peculiar and cherished cubit of theirs, which they possessed as a people or family 'long before 'they went down to Egypt,' and which Moses took special care that they should always employ for *sacred* purposes after the Exodus), Sir Isaac proves it to have been close on 25 inches in length,³—basing then

¹ The latest authority for the size and figure of the earth (vol. ii. Sect. v.) is the noble quarto published last year by the Ordnance Survey, after comparing the linear standards of many countries. Two methods for computing arc-surveys are there adopted, with the same materials observed. The first of them gives the earth's polar axis = 500,482,296, and the second = 500,522,904 British inches; and as the former has rather more weight than the latter, the weighted mean of the two comes out exceedingly close upon 500,500,000 British, and 500,000,000 Pyramid inches. The mean equatorial axis is about 1·300th larger, or near to 502,179,000 British inches.

² See page 341 of our vol. ii.

³ The *last* length obtained from all his data by Sir Isaac Newton for the sacred cubit, is nearly two-tenths of an inch less than 25 inches,

on this remarkable research by the greatest master mind that ever lived in modern times, John Taylor shows, that such a 25-inch cubit is most remarkably and astonishingly earth-commensurable,—being, the one-ten-millionth of the semi-axis of rotation of the earth. Or, whereas the modern French metre was chosen by decimal-loving mathematicians, to be the one-ten-millionth of a *quadrant* of a particular meridian of the earth,—the sacred cubit, received so very early into their possession by the descendants of Abraham, was the same admirably even fraction, but of an infinitely better portion of the earth-globe to refer to; viz., a straight line coming from the centre to the surface, along the governing axis of the world. An extraordinarily convenient length too, for man to handle and use in the common affairs of life, is the one-ten-millionth of the earth's semi-axis of rotation, when it comes to be realized;—for it is extremely close, either to the length of the ordinary human arm, or to the ordinary human pace, in walking with a purpose to measure.

Now this remarkable, or even more than remarkable cubit, Mr. Taylor believed the planners of the Great Pyramid knew perfectly well of,—even in all its grand relations to nature,—though the Egyptian people did not. They, the Egyptian people at large, deep-dyed idolaters in their hearts, worked their

and has too generally been the only one quoted; but it is worth while to remember that the mean of all his *nine* determinations or limits, amounts to 25.07 British inches. See 'Hebrew Standards,' Sect. v., vol. ii.

ordinary work according to their well-known profane cubit of 20·7 inches in length, with its subdivisions, if necessary, into six palms, and each palm into four digits;¹ but the planners of the Great Pyramid were no more bound to that measure, which is void of all modern scientific recommendation,—than they were to the degrading animal-worship of the dwellers in the valley of the Nile, or to that grievous sin which themselves so strenuously, though in vain, endeavoured to put down.² Those purer-minded architects indeed contrived, apparently, to make their heathen masons labour in such a manner, as to be in reality introducing the sacred measure, when they least suspected what they were about; and to introduce it too in the most signal and appropriate manner, or in a form pervading the whole building, and with a reference to that which measures everything; for, after many thousands of years, the method seems to have been discovered with certainty, and to be simply this, viz.,—that there are as many lengths of the sacred cubit in one side of the Pyramid's base, as there are days in a year.

That is, $25 \times 365 \cdot 25 = 9131$. But these represent Pyramid inches; and when reduced to British inches, are $= 9140$; while the mean length of the Pyramid's base side derived from measure, is, with

¹ Some hierologists say, in later times into seven palms, and each palm into four digits; see vol. ii. Section v.

² See vol. i. chap. xv. p. 467.

some small limits for probable error (see p. 127),
= 9142.

The nobler cubit therefore really employed, or intended to be perpetuated to distant ages,—was concealed from vulgar gaze, under the veil of the earthly connexion between time and space. By no means an inappropriate idea, when the standard of length is founded on the earth's axis of rotation, the action of which mechanically *makes* the successive days ; and when the general form of the whole Pyramid, according to John Taylor's grand circular proportion, causes its vertical height to present towards the continued length of the four sides of its base, the proportion of radius to the circumference of a circle ; —or a model of the circuit of the mean earth round the sun in the course of a year,—and where, on the perimeter of the Pyramid, the earth's mean daily motion is represented by the round and even quantity of, 100 inches of length.

I had formerly imagined, that the expression for one side might be, not 365·25 times the sacred cubit, but 366·00 times,—as being the nearest even number of turns made by the earth on its axis in the course of a year ; but under the aspect of more numerous Pyramid measures than I was then acquainted with, especially those of Mr. Inglis,—the 365·25 appears to be the more probable supposition. And yet the 366 may perhaps in a manner be present, simultaneously, through means of the peculiar office of the 'pavement,' which lies both around

and partly under the Pyramid ; and this is a feature which we must pay close attention to, in spite of the trouble of so doing, if we would understand the smaller and residual features of the monument.

Architects in *modern* times, have in their drawings, plans, or elevations, often finished off the Pyramid below, according to their own æsthetical ideas of propriety,—based either on Gothic or Grecian art ; and hence large pediments, bases, flutings, and what not. While one very well-intentioned and venerable investigator of geometrical proportions, writes me that he has just arrived, theoretically, at a high and noble base for the Pyramid,—which base, finished off with a plinth, he conceives would be most suitable for enabling a whole row of astronomers to observe the Pole-star from, like a row of harpers, harping with their harps !

But of all these additions to its simple figure, the known facts about the Pyramid give no testimony whatever. M. Jomard, indeed, in the great French work, has, with some appearance of authority, drawn the Pyramid with a rectangular base 72 inches high ; but that seems merely derived from a misapprehension as to the nature of the ‘ course ’ of rock, left standing by the builders near the north-east corner, merely to save interior component masonry ; and the only *real* authority touching the ancient appearance of the lower part of the Pyramid outside, is Colonel Howard Vyse with his casing-stones *in situ*.

These remarkable stones, according to his testimony, spring at once, with their oblique exterior slopes of $51^{\circ} 51' 14''$, from the upper surface of a broad, flat, level, area of exquisite masonry, known as 'the pavement;' which in *that* part of the Pyramid passes under it to some extent, is 21 inches thick and 402 inches broad, from the outer line of the casing-stones. Hence the extensive assumption has been made by some persons, that a pavement of the same breadth and thickness completely surrounds the Pyramid; but, so far as thickness is concerned, a portion of pavement is shown in one of our Stereophotographs, taken near the north-west socket,—and is found to be barely more than 10 inches thick. By examining, however, the angles and positions of the joints of this fragment, the inference may be pretty safely made, that the lower part of the *corner-stone* of the oblique casing-stone sheet there, must have been of rectangular figure, though pyramiddally bevelled above; and that it did, by the depth of such rectangular part or base, go through the whole thickness of the pavement there, whatever that was, and into the socket-hole cut for it in the rock below. Hence the horizontal distance from outer corner of one, to outer corner of another, adjacent socket-hole,—measured *on* the pavement and by means of the rectangular edges of the holes worked therein,—is, or should be, the true measure of the length of the ancient maximum bevelled side of the Pyramid; and may be considered equal to, either, 9140 or 9142

British inches, as already indicated. But whether that number would be extended to 9159,—by the slope being carried symbolically through the pavement, and then measured on the level of its under side, or at a thickness nearly similar to that which obtains at the north-west corner,—is a residual problem that must be left, notwithstanding its importance, for future excavations to settle; seeing that the earth, and the earth only, still retains the secret.

Meanwhile, attending to nothing but what has been actually secured by measure; and remarking, too, that all the minute differences of the slightly varying theoretical lengths we are now in search of, are contained *within* the mutual discordances of the best modern observations,—it may be expedient to inquire, whether the Great Pyramid stands sensibly alone; or whether it has many competitors amongst the other Pyramids of Egypt,—for making so noble a use, as it seems to do, of the sacred cubit. That is, for coming either so close, or perhaps closer, to the expressive quantity of 9140 British inches. Referring, therefore, to the works of Colonel Howard Vyse,—the best authority on the subject amongst all men of all nations,—we find that he has published from his, and Mr. Perring's, measures for the lengths of one side of the bases (always assumed square), of many Pyramids, respectively as follows:—

	British Inches.
Second Pyramid of Jeezeh, lat. $29^{\circ} 59' N.$, side of	
base,	= 8493
Third " " " " " "	= 4254
Fourth, Fifth, Sixth, Seventh, Eighth, and Ninth,	
all under	= 2064
Pyramid of Aboo-Roash, lat. $30^{\circ} 2'$, . . .	= 3840
" Zouyet el Arrian, lat. $29^{\circ} 57'$, . . .	= 3600
Great Pyramid of Abooseer, lat. $29^{\circ} 54'$, . . .	= 4320
" " Sakkara, lat. $29^{\circ} 53'$, . . .	= 4212
North Stone Pyramid of Dashoor, lat. $29^{\circ} 49'$, . . .	= 8634
Southern " " lat. $29^{\circ} 48'$, . . .	= 7402
Greater Pyramid of Lisht, lat. $29^{\circ} 38'$, about . . .	= 5400
Pyramid of Meydoon, lat. $29^{\circ} 27'$, . . .	= 6360
" Illahoon, Faioum, lat. $29^{\circ} 17'$, . . .	= 4320
Other Egyptian Pyramids generally, under . . .	= 3000

Hence there is no other known and measured Pyramid throughout all Egypt, which can compete in the remotest degree with the Great Pyramid of Jeezeh, for possessing after so signal, or anything like so accurate, a manner, if indeed in any way, a memorial of the sacred cubit. A length, that cubit, in its earth-polar radius commensurability, above all human knowledge or effort from the beginning of history to within the last two hundred years,—to have been arrived at *intentionally*; though when once the idea is given out in the present age of the world, any one and every one can instantly see the many recommendations which attach themselves to such a standard for linear measure.

Most fortunate, therefore, is it for practical metrology, that with the theory of the sacred cubit in our minds, and the results of recent scientific measures of degrees of the meridian in our libraries, we may entirely dispense for the present with a

solution of the small remaining uncertainties about the base of the Great Pyramid. And, content with its measurement having given the cubit's length as $9142 \div 365.25 = 25.03$ British inches, accurate probably within .005 of an inch,—we may proceed to recover with still greater exactness that grand linear standard from the earth itself; arranging a scheme of linear measures thereupon in the following form, but with leading reference to the Pyramid numbers of 5 and 10,—and finishing with 4, in imitation of the four sides of the base:—

PYRAMID LINEAR MEASURE.

1 inch, roughly a thumb-breadth,	= the unit.
25 inches, roughly an arm, or a pace, length,	= 1 sacred cubit.
100 sacred cubits, or 2500 inches,	= 1 acre-side.
25 acre-sides, or 2500 sacred cubits,	= 1 mile.
4 miles, or 100 acre-sides, or 10,000 sacred cubits,	= 1 league.

COMPARISON OF PYRAMID, WITH BRITISH, LINEAR MEASURE, AND WITH THE EARTH'S SEMI-AXIS OF ROTATION.

Pyramid measures.	British measures.	Earth's semi-axis of rotation, assumed = 250,250,000 British inches.
1 inch, . . .	1.001* British inches, .	1-250,000,000th.
1 sacred cubit, . .	2.083 " feet, .	1-10,000,000th.
1 acre-side, . . .	0.9992 " acre-side,	1-100,000th.
1 mile, . . .	0.9874 " miles, .	1-4000th.
1 league, . . .	1.3166 " leagues,	1-1000th.

The inch and sacred cubit are the only Pyramidally authorized parts in the above scheme; though there appears much probability that there

* .001 of an inch = half a hair's-breadth of the finer human order.

will be found by and by, similar authority for the acre-side in the 'pavement,' when fully opened up. But meanwhile, the above-given Pyramid acre-side and mile, come so very close to the British acre-side and mile,—that they can hardly be passed by ; and the Pyramid league forms so neat a fraction of the earth's semi-axis of rotation, as to present the very essence of a connecting link between terrestrial, and celestial, distance measures.

SECTION II.

STANDARDS OF WEIGHT.

WITH measures of weight, those of capacity are usually classed ; and will be here also, because they serve as a bond of connexion between weight, which would otherwise be perfectly isolated in metrology, and a linear standard supposed to have been already determined ; but they further evidently require, besides the certain mensuration of any cubical amount of space, as such, that that bulk shall be occupied for the time by some substance or matter of a known and uniform density or specific gravity. The reference for this purpose usually made by most nations, has been to distilled water of a given temperature ; and the standard of weight then becomes the weight of the quantity of water necessary to fill a vessel, whose hollow interior

measures a certain previously chosen amount of cubical size, or capacity measure, defined in terms of the linear standards.

On this well-known principle the late John Taylor announced, after studying many Pyramid writers, that the once so-called *porphyry*, but really *granite*, perhaps syenitic-granite, coffer in the secluded King's chamber,—must have been intended to serve, with its hollow cubical space or contents, as a standard measure of capacity and weight. And he enlarged much upon the evident manner in which the whole Pyramid was planned and builded, as if its chief purpose were to keep that hollow, rectangular, open, box-like vessel, and nothing else than that,—in the utmost degree of safety that can be materially insured to anything whatever upon earth.

So far, he was not altogether original; for the Rev. Thomas Gabb, R.C., in 1806, mentions that the French *savants* of 1799, 'give it as their belief that 'the excavation of this granite chest was originally 'intended, by the founders of the Pyramid, not for 'the repository sarcophagus of a corpse, as has been 'the prevalent but truly ridiculous opinion, but for 'a standard measure of capacity.' Similarly a certain Mr. A. P. J. de V——, of Paris, in 1812, in his *New Researches on the Origin and Destination of the Pyramids of Egypt*, speaks of the coffer in the Great Pyramid as a 'vase of porphyry, that 'can never be taken out of the Pyramid, and was 'intended to serve as a *measure of capacity*.' The

English anonymous author of 1706, also obtains some measures of capacity from the coffer,—but in a manner not dependent on its cubical contents,¹ and not necessarily forestalling any of these later authors in their simpler and larger conception.

John Taylor, however, is yet to be noticed before each and all his compeers,—not only on account of the superior extent and variety of his researches touching the coffer, and which should be read in his own book, (*The Great Pyramid: why was it built, and who built it?*); but by reason of his successfully identifying its cubical contents with that of the ancient Hebrew capacity measures on one side, and the Anglo-Saxon, on the other. So that, according to him, either, four Hebrew chomers, or, one Hebrew laver,—and, on the other side, either, four British quarters, or, one original Anglo-Saxon chaldron, chalder, or chaudron,—equally represent the exact cubic contents of the Great Pyramid's primeval coffer.

This interesting conclusion, however, depended entirely on the correctness of the numbers employed by John Taylor for the internal capacity of the Pyramid coffer; and though he had taken them fairly and with judgment from two good observers, viz., Professor Greaves in 1639 and Colonel Howard Vyse in 1837,—yet there was a strange mass of testimony against them, as evidenced by the follow-

¹ By taking some single linear measure, either from the inside or outside of the coffer, looking on such length as the axis of a sphere, within whose hemisphere a certain polygoneous figure of a particular capacity may be described.

ing table of authorities prepared by myself in 1864 :—

MODERN MEASURES OF THE GREAT PYRAMID COFFER.

Authors.	Date.	Material as Named.	Exterior.			Interior.		
			Length.	Breadth.	Height.	Length.	Breadth.	Depth.
	A.D.		Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
Bellonius, . . .	1553	Black marble,	144'	72'	60'	..	..	..
P. Alpinus, . . .	1591	Black marble,	144'	60'	60'	..	..	..
Sandys, . . .	1610	....	84'	47'	Breast High }	..	..	..
De Villamont, . .	1618	Black marble,	102'	..	60'	..	..	..
Professor Greaves, .	1638	Thebæic marble,	87.5	39.75	39.75	77.856	36.616	34.320
De Monconys, . .	1647	....	86'	37'	40'	..	..	..
M. Thevenot, . .	1665	Hard porphyry,	86'	40'	40'	78'	39'	..
M. Lohr, . . .	1674	....	74'	37'	40'	..	..	..
M. Mallet, . . .	1692	Granite, . . .	90'	48'	48'	..	..	..
De Caceri, . . .	1693	Marble, . . .	86'	37'	39'	..	..	..
Lucas, . . .	1699	Like porphyry,	84'	36'	42'	74'	36'	..
Egmont, . . .	1709	Thebæic marble,	84'	..	42'	72'	..	..
Père Sicard, . . .	1715	Granite, . . .	84'	42'	36'	..	..	..
Dr. Shaw, . . .	1721	Granite, . . .	84'	36'	42'	72'	34'	..
Dr. Perry, . . .	1743	Granite, . . .	84'	30'	36'	..	..	..
M. Denon, . . .	1799	.... ?	84'	48'	38'	..	..	..
M. Jomard, . . .	1799	Granite, . . .	90.592	39.450	44.765	77.836	36.604	37.285
Dr. Clarke, . . .	1801	Granite, . . .	87.5	39.75	39.75	..	..	..
M. Hamilton, . .	1801	Granite, . . .	90'	43'	42.0	78.1	30.1	..
Dr. Whitman, . .	1801	....	78'	38.75	41.5	66.1	26.75	32'
Dr. Wilson, . . .	1806	....	92'	38'	..	80.1	26.1	34.5
M. Caviglia, . .	1817	....	90'	39'	42'	78.1	27.1	..
Dr. Richardson, .	1817	Red granite, .	90'	39'	39.5	..	..	..
Sir Gard. Wilkinson,	1831	Red granite, .	88'	36'	37'	..	..	..
Col. Howard Vyse,	1837	....	90.5	39.0	41.0	78.0	26.5	34.5

From these particulars, it will be seen that—without having regard to the almost incredible differences amongst minor observers,—the depth element, as given by the French *savants* of 1799, disagrees from the determinations adopted from Greaves and Vyse, by nearly three whole inches ; equivalent in its effects on the capacity of the coffer, to an addition of about 6000 cubic inches ! With whom, then, lay the burden of such an error as this ; or did it perhaps reside in the coffer itself, owing to its not being of

a regular figure, and having been measured in different parts by successive travellers?

These were the questions to be practically settled in 1865; and I very soon satisfied myself at the Pyramid, despite all the modern chippings of the edges of the coffer; *first*, that the errors of its internal figure were contained within very narrow limits; and *second*, that the French *savants* were the parties who had been so unfortunate as to have an error of three inches of excess in their measured depth, though true to the tenth of an inch as to length and breadth. But there was a worse error still, pervading both their engravings, measures, and descriptions; an error, too, vitiating the measures of all the other known authorities as well,—in that, none of them had alluded, so far as I know, to a certain ledge which is cut *inside* the top of the coffer sides, on the east, south, and north, and all over the breadth of the western side, to a depth of 1·72 of an inch.

Greaves, in 1639, describes the coffer as presenting a rectangular figure of pure mathematical form; ‘or two cubes finely set together, and hollowed within; it is cut smooth and plain, without any sculpture or engraving, or any relevy or embossment;’ and the admirably executed plates of the French national work make it, therefore, a regular-shaped, equal, box-sided vessel in the year 1799; such, also, is the appearance given to it in Sir Robert Ainslie’s view, copied by John Taylor, into

his *Great Pyramid: why was it built, and who built it?* and there are numerous allusions in older authors, to the coffer's having been always a lidless vessel, like a water cistern ; a stone box without a top ; a granite chest without a cover, and many similar phrases. Yet, the mere presence of such a ledge as is plainly now to be seen, not only implies the once existence of a lid,—but also that the vessel must have been serving as a sarcophagus ; and, because, that is the manner, or very near it, in which the lids of genuine sarcophagi are pushed on, and fastened down, into their places.

Although an absolute discovery to me at the time, this ledge feature, I have since found, is represented in Howard Vyse and Perring's large Pyramid views, published in folio, in 1840. How these able authors regarded the feature, does not appear ; nor do I know whether the usually irreproachable members of the French Imperial Institute, are prepared to maintain the truth of their large engravings, *for the date at which they were made* ; or to imply, that the ledge was cut between their day, and that of Howard Vyse. In the meanwhile, however, most persons will probably assume that the remarkable cut-out must be far older than the first French Revolution ; and some will even hastily consider it as entirely subversive of the recent metrological-coffer idea.

So, too, it would be, perhaps, if there were anything in the present sarcophagus-guise of the coffer

in *addition*, as to substance, to what was required for the original coffer, or mere box-shaped vessel. But that is not the case ; for the ledge is merely something cut into, or removed away from, such a vessel ; and something, too, which would be very easy for any granite mason to effect, after the box form had once been realized.

We may prove, moreover, that after the coffer had had a sarcophagus-appearance given to it by the cutting of such a ledge into its top,—it would not have made a good sarcophagus according to the ideas of the time ; for, at the second Pyramid, where there is an acknowledged sarcophagus of red granite, and which is, with its lid, in excellent preservation,—the following system obtains. The lid slides on to the top of the body, by means of acute angled grooves ; and when finally in its place, certain vertically-sliding pegs fall partly out of holes in the lid, into corresponding holes in the top of the lowered side of the sarcophagus,—completely preventing the lid being drawn horizontally back ; while the oblate spread of the side grooves, prevents its being lifted up or taken off vertically. The whole thus forms an arrangement which locks itself, and is eminently suitable to the purposes of a sarcophagus proper.

But at the Great Pyramid vessel, though there are similar holes in the west side for falling pins to fall into, out of a once existing or intended lid,—and the arrangement would prevent such lid being drawn

horizontally back, after being once pushed into its place,—yet the side grooves being *rectangular*, and parallel with the coffer sides, they could not in the slightest degree prevent the lid being lifted straight, or vertically, up,—and freely exposing the contents of the coffer, if any.

Now this shows a degree of clumsiness in contrivance and inefficiency of workmanship which we should be careful how we charge on the architect of the Great Pyramid, where everything else is carried out with far more skill and perfection than at the second Pyramid; and it may even be taken as a pretty secure indication, that the cutting of the ledge and turning, or attempt towards turning, the coffer into a sarcophagus,—were the work of subsequent hands. Whose these were, during the long ages which intervene between us and the original builders, may be an interesting inquiry to take up when we come to the history and personal experiences of the Great Pyramid; but meanwhile their names signify nothing to our present purpose, which is solely directed to finding out, if possible, by modern measures—what were the cubical contents of the vessel in its *original state*, before any ledge was ever cut into its fair proportions; and then ascertaining—if such cubical contents correspond, or not, with a certain exact, and even inexorable, quantity, derivable from the theory of the Great Pyramid, when applied to the earth as known to modern science.

This theory is shortly, as regards the kind of standards now under discussion,—that a cubic space is to be formed, with sides having a length equal to the one-ten-millionth of the earth's axis of rotation, or 50 Pyramid inches.¹ A *tenth* part of such space, —or 12,500 cubic inches (agreeably with the Coptic interpretation of the name of Pyramid), is then to be filled with matter of the *mean density* or specific gravity of the earth as a whole. In which case, such a mass will form the *grand weight* standard of the Pyramid ; while the *space* occupied by an equal weight of pure water, at a given temperature,—will form the *grand capacity* standard of the Great Pyramid ; or, as we believe, will represent, and be represented by, the cubic contents of the hollow of the coffer : but this is the point to be tested by actual measure and calculation.

Much in the problem, evidently depends on the precise value of the earth's mean density, as compared with that of water ; and such an introduction of that important natural characteristic of density, with respect to the mean of the whole contents of our earth-ball globe,—is a novelty amongst all known human systems of metrology ; the very best and most modern of which, either make their weight-

¹ The standard of *linear* measure is the one-ten-millionth of the *semi-axis* of rotation, or 25 inches ; because, in distance-measuring amongst celestial globes, the quantity to be measured is always scientifically the distance from *centre to centre of them*. But the moment we come to any questions of the earth's actual bulk, the whole diameter, from one side to the other, is the effective length to be guided by.

standard a something entirely accidental, as with the English (*i.e.*, so far as most modern Englishmen are aware of) ; or overlook every other constituent of the earth, except that one article of water ; as with the French metrical, and other European, arrangements on modern scientific principles.

Yet if there is commendable virtue amongst any of these systems,—and they do take much praise to themselves, in referring their *linear* standards by an even fraction to some *length* scientifically connected with the size of the earth as a whole,—surely there must be similar intellectual advantage, in referring all weight and capacity standards to the most practical features bearing on the weight and capacity of the earth, likewise as a whole. The capacity of the earth, indeed, is evidently derivable from linear measure and geometrical theory ; but its weight, depends altogether upon the proportionate amounts and densities of all the multitudinous solids and fluids which together make up its wondrous bulk ; and in which too, there is a far larger amount of solid and heavy, than light and watery matter.

One chief superiority of our earth over the larger planets, such as Jupiter, Saturn, Uranus, and Neptune,¹—according to that universal genius, the late respected Master of Trinity, in his *Plurality of Worlds*,—consists in its possession of so large a per-

¹ The density of these planets, in terms of the earth's mean density, is stated in Sir John Herschel's *Outlines of Astronomy*, as 0·24, 0·14, 0·24, and 0·14 respectively.

centage of heavy solid matter, as to make its specific gravity nearly five times theirs ; and led him to conclude that their vasty spheres, consisting of little but water and mist, can be no sufficient or appropriate abode for reasoning and intelligent beings. How important then for man, both æsthetically to acknowledge the *terrestrial* fact of superior density, in the principles whereon terrestrial standards for measuring weight and density are founded ;—and what a duty, religiously, to symbolize his thanks for all the myriad curious substances,—all of different densities or capacity weights,—and usually esteemed more and more precious as they exceed in specific gravity,—which the Creator has been pleased to introduce into the composition of this earth of ours. For no other purpose, too, that the greatest sages can see,—than for the present and future benefit, and ultimate high civilisation, as well as enjoyment,—of working, intellectual, and continually advancing mankind.¹

Fortified, therefore, by this view,—which, in so far as it came to me through the Pyramid, is not

¹ Sir Samuel Baker, in his recent explorations in Central Africa, had an admirable opportunity of witnessing some difficult social questions reduced to their primitive simplicity, and elemental clearness. Hence we find him recording that the poorest, lowest, most degraded and most miserable of all the nations he met with, were on the marshy banks of the White Nile, in a fine warm climate, but a world of water, mud, and reedy vegetation, abounding in, and apparently just fit for, hippopotami, crocodiles, buffaloes, wild-geese, and nothing higher. But as soon as he reached the hilly country,—especially where the hills produced heavy iron, as well as lighter stones and agricultural soils,—instantly there was a most marked improvement in the natives, and a rise in their whole style of life and social well-being.

of my invention,—let us see how the earth's mean density comports itself in the particular coffer question. The numerical value of the remarkable quantity (in terms of water), is not yet quite so accurately determined by modern science as it should be ; but may, for reasons presently to be adduced, be taken as 5·70 ; *i.e.*, 5·70 times as heavy, as an equal bulk of distilled water at a temperature of 68° Fahrenheit. Wherefore, on the previously announced principles, 12,500 cubic inches multiplied by 5·70, or, 71,250 cubic Pyramid inches, ought to form the internal bulk of the grand standard of capacity-measure for the Great Pyramid.

Now what does the interior of the coffer measure, when restored,—by reference to many of the original traces which happily still remain,—to its original unsophisticated shape and true internal size ?

Referring to the measures in vol. ii. p. 122, the mean length, breadth, and depth, inside, by sixty measures, came out, in British inches, 77·93, 26·73, and 34·34 respectively. These are, in Pyramid inches, 77·85, 26·70, and 34·31 ; and give—by being multiplied together—71,317 ; or too much by rather less than 1-1000th.

Of the practical closeness of this approach to the theoretical quantity, we may best judge, by computing the cubical contents of any acknowledged sarcophagi, treated in the same manner as unledged vessels ; for then, the sarcophagus of the second Pyramid

is found to give by the measures in vol. ii. p. 272, 66,410; or 64,554 by Howard Vyse's numbers; that of the third Pyramid by Howard Vyse's measure,¹ = 46,219; a sarcophagus in a large tomb near the Pyramid, pictured in the great French work, = 51,117; while that in the fourth Pyramid = 29,610; and in the fifth Pyramid, = 39,775 (both of them, according to Howard Vyse); and others are still smaller. These others are further more or less ornamented artistically on the exterior; and in so far, stand entirely removed from the simple conception of vessels for purposes of mensuration; whose only claim to admiration should be, the closeness of their realization of simple truth and exact physics. Yet this idea is not so generally admitted as it might be,—for I was lately rather scornfully attacked by a really very able member of one of the learned professions in public, and in private a wealthy, highly-educated, representative man of the nineteenth century A.D., with—‘but if this Great Pyramid coffer was intended for such an important destiny as to be a standard of measure for all nations, pray what sort and amount of ornament is there about it?’

Of *that* species of meretricious perfection, then, let all men know at once, there is nothing whatever about the Great Pyramid coffer; while there are traces, on the contrary, that if anything else was indulged in beyond the rectangular figure, it was

¹ Volume ii. p. 123, of Vyse's *Pyramids of Gizeh*.

rather in the direction which the venerable Mr. Jopling has maintained during some years past ; as, that it was formed with views of *relative* commensurability ; at least in so far that the cubical contents of the outside were made just twice those of the inside. An entirely theoretical conclusion of Mr. Jopling's was this idea, for none of the recorded measures came even approximately near the desired quantities ; but on referring to my measures in vol. ii. p. 119, where the linear dimensions are corrected, for the first time in the history of such measures, for the error of figure of the hitherto assumed perfect planes of the sides, they will be found, expressed in Pyramid inches, to be

$$(89\cdot62 \times 38\cdot61 \times 41\cdot13) \div 2 = 71,160$$

the mean of which, with the interior determination, allowing for errors of measurement and straining of figure by the tilted position of the coffer, comes to 71,238 ; while the theoretical quantity required, is 71,250 ; showing an error of barely 1-6000th.¹

Let the uncertainties, however, of our present measures touching the true size of the coffer's interior, or of this practically obtained number, 71,238,—be

¹ The sarcophagus of the second Pyramid, treated similarly, without reference to its cover, or ledge, yields 82,200 nearly, against 66,410 ; the sarcophagus of the third Pyramid, deeply carved outside, gives 62,160, against 46,219 ; the sarcophagus of the fourth Pyramid, 38,440, against 29,610 ; and that of the fifth Pyramid, 70,565, against 39,775 : leaving the Great Pyramid's coffer, therefore, perfectly *unique* throughout all Egypt yet measured ; and, as well for the absolute contents of the interior, as for the duplex commensurability of interior and exterior.

considered 100 cubic inches \pm , though they are probably less;—then it is most important to note, as comparing modern science on the whole, with the primeval tradition of the Pyramid,—and for understanding our own place in ‘universal scientific history,’—that the uncertainties of the *theoretical* quantity of 71,250,—as depending on the imperfections, or at least unexpected and anomalous differences found amongst the *best modern scientific determinations* of one of the natural elements involved in the question,—amount to *several* hundreds, and perhaps even *thousands* of inches!

The usually received quantity, as an instance, for the *mean density* of the earth, has been for some years past, not the 5.70 we have assumed, but 5.67; as depending on the late Francis Baily’s repetition of the Cavendish experiment in 1842, —where his mean results, for several different branches of the trial, varied between 5.6604 and 5.6754. (See vol. xiv. of *Transactions* of Royal Astronomical Society.) But though Francis Baily’s was by far the best determination ever made, up to that time,—his successors were not satisfied with it; and, on one side, the present most learned Astronomer-Royal, with all the power of the ancient National Observatory at his disposal, has since tried a different method of arriving at the same quantity in nature; as likewise, on another side, has Colonel Sir Henry James, with the far more extensive means of the Ordnance Survey establishment placed under his hand.

If two men and two offices had been picked out from the whole nation for undertaking this question, no others probably could, or would, have been selected as more proper and efficient for it, than these two chiefs; and the wisdom of the choice has been testified by the Royal Society of London printing both their papers, descriptive of their respective proceedings, *in extenso* in the *Philosophical Transactions*. Wherefore, by looking to the results recorded there, we may have a measure at once of what the powers may be of modern science in that particular field; and they appear to be thus:—Had the Astronomer-Royal's 6.565, been the only new determination,—the earth's mean density (the mean between the above numbers and Mr. Baily's being taken), would have been raised up from 5.675 to 6.120, and the theoretical coffer numbers from 70,938 to 76,500; but had Sir Henry James's 5.316, been the only modern repetition,—the received mean would have been reduced to 5.496, and the coffer numbers to 68,700; or, with similar reference to both, it would have been raised to 5.852, and the coffer numbers to 73,150. Indicating, in fact, that the question of the earth's mean density, though a thing exact in itself, and well known to the Almighty,—is so exceedingly difficult to man, that modern science is hardly sure of being right in the unit's place of it; and is quite incompetent as yet, to speak positively of its tenths, hundredths, or thousandths. While the advance in accuracy of this sort of observation has been so

nearly imperceptible during the last quarter of a century, that hundreds of years may pass away—before even the best philosophers will have determined, *from the earth*, what a very moderate man may determine *from the coffer*, viz.,—whether, in the theoretical expression already assumed, the earth's mean density ought to be expressed by 5·69, 5·70, or 5·71.

We must confess, that 5·70 appears to us not only the quantity indicated within very narrow limits by the coffer,—but that which is pointed to also by the earth-experiments, though within wider limits; on giving, as judgment requires, a much greater weight, to Baily's, than to the two subsequent determinations. (Vol. ii. p. 451). Hence, in assuming 5·70, for the value of the earth's mean density—expressed in terms of water,—we are not only within the limits of the best individual observations of that quantity by the first modern philosophers,—but, as close as can be, to the most rational mean of all their measures. And if any one chides us for not waiting contentedly for a few centuries more, until a much better earth determination,—and one not depending on a mean amongst hideously discordant single results,—shall have been obtained by modern science; we are compelled, amongst other things, to state in self-defence,—that both the explanation of the theory of the Great Pyramid (which has been waiting for four thousand years already), and the settlement of vexatious agitations respecting the best metrology for existing mankind, can admit of delay *no* longer.

Hence, while in the matter of *linear* measure, the Great Pyramid both originated the idea of reference to the earth's semi-axis of rotation, by a one-ten-millionth for a standard ; and has also furnished from its own base side the material length of such a standard with considerable exactness, say to within 0·01 of an inch,—we yet preferred taking the length, much within that 0·01 of an inch, from modern scientific knowledge of the earth, when employed in accordance with the Pyramid *idea* ; and capable then, of giving the standard true, probably to within 0·001 of an inch. But with *weight* and *capacity* measure, we must not only accept as a gift the idea of referring to the earth's mean density,—rather than to the density of only one of its myriad components—from the Great Pyramid ; but must also receive therefrom, the exact numerical value of that *mean density* element—in shape of measures of the coffer, treated according to the Pyramid formula ; and certain, within a very small fraction of those large differences, which are found among the best existing of direct *earth-mean-density* measures.

Our proof, then, that the coffer is the right vessel originally intended for a weight and capacity standard,—depends upon its measured contents coming out close to what was expected by a certain theory, closely based upon the previously proved linear standard. But seeing that that theory must also, be partly founded on, or rather tested by, modern determinations of the *earth's density*, which deter-

minations are by no means very close or accurate, —the proof may be regarded as not an absolutely certain one. Most valuable, therefore, is some further evidence which the Pyramid itself affords, illustrating not only that the coffer's size is no accidental matter, but that it was something had in extraordinary regard by the architect, when building in the mighty granite blocks of the King's chamber. For by those blocks he has given us another numerical test, by which we may prove that the present coffer was the *original* one; and is still therefore the right vessel in the right place, viz., the chamber originally prepared for, and adapted to, it; and which would suit no other known Egyptian sarcophagus or coffer-like vessel in the same strikingly appropriate manner, or in any way suitably with the admirably scientific linear-standard theory.

The Coffin belongs to the King's Chamber.

In the so-called, in modern times, 'King's chamber' of the Great Pyramid, stands the coffer now; but what was the apartment designated originally?

Over its doorway of entrance, and on the outside thereof, or as forming the south wall of the ante-chamber, is a remarkable symbol, which has been variously described as consisting of four, or five, lines. Our measures of the thickness of each line, and the width of the separations between them, compared with the whole breadth of that wall, in-

dependently measured (see vol. ii. p. 97 ; also Plate XII. vol. ii.), prove incontestably that there are four deeply cut, equidistant vertical grooves, so placed as to divide their containing wall into five vertical strips ; illustrating, therefore, *a division into five.*

This, too, is all that can be really stated about them ; for, as to the architectural apology that they were grooves for ropes employed in lowering certain supposed portcullis-blocks in the antechamber,—that was not a usual Egyptian practical method of accomplishing such work ; and there are no corresponding grooves on the opposite sides of the room or on the floor ; nor have any good reasons been given, why the grooves on the south wall should pass along its entire extent in height, or from actual top next the ceiling to very bottom, as marked by the low entrance into the King's chamber,—when the supposed portcullis-blocks, and even the utmost reach of their sliding frames, were only a small part of the same height.

Hence all that we can declare as the fact, is, that near the interior of a building whose ancient name, it is said, was 'a division into ten,'—there is one wall typifying, or rather positively illustrating, 'a division into five.' And this symbol is the last object seen by any one entering the King's chamber, as he makes his final stooping progress to enter that important room ; for the sign may be said to be fastened over the doorway thereof outside, and to

belong therefore rather to the large King's chamber than the small antechamber.

Is that symbol, then,—so remarkably held forth to every entrant,—the true name of the larger chamber; or is it intended to call attention to something of a similar character therein?

Let us see.

The coffer, according to the metrological theory, is founded, in part, on the one-ten-millionth of the earth's axis of rotation; or, fifty inches.

This is something suspicious of a connexion, especially if divided by the Pyramidal 10, but not enough; and on looking round the room, an attentive observer may soon perceive a more striking illustration of a division into five; in that the four walls of the room have each, four horizontal joint lines, actually dividing the walls' whole surfaces into *five* horizontal stripes or courses. (Plate XIII. vol. ii.)

Rather remarkable is it for testing the sufficiency of modern travellers' descriptions (for no Greek or Roman visitors were ever in this room), that some of them have stated these walls to be composed in a single course, and others in six courses, or variously as thus:—

SANDYS, A.D. 1610, says—'Eight stones flagge the ends, and sixteen the sides.'

PROFESSOR GREAVES, 1639.—'From the top of it descending to the bottom, there are but six ranges of stone, all which, being respectively sized to an equal height, very gracefully in one and the same altitude run round the room.'

LORD EGMONT, 1709.—‘The walls were composed of five ranges of stone.’

DR. SHAW, 1721.—‘Height (of five equal stones) sixteen feet.’

DR. POCKOCK, 1743.—‘Six tiers of stones of equal breadth compose the sides.’

M. FOURMONT, 1755.—‘The walls are composed of six equal ranges.’

DR. CLARKE, 1801.—‘There are only six ranges of stone from the floor to the roof.’

DR. RICHARDSON, 1817.—‘Lined all round with broad flat stones, smooth and highly polished, each stone ascending from the floor to the ceiling.’

LORD LINDSAY, 1838.—‘A noble apartment, cased with enormous slabs of granite twenty feet high.’

W. R. WILDE, and MR. R. J. A., 1837.—‘An oblong apartment, the sides of which are formed of enormous blocks of granite reaching from the floor to the ceiling.’

E. W. LANE, and MRS. POOLE, 1843.—‘Number of courses in walls of King’s chamber, six.’

Poor John Taylor, too, misled himself and others in this particular, by making a copy from Sir Robert Ainslie’s¹ view of the King’s chamber, the frontispiece of his first edition of the *Great Pyramid: why was it built, and who built it?* for therein are pictured *six* courses, as clear as the art of the engraver can make them.

But that the number is five, I presume I may state with certainty, and without apology,—from having measured them again and again; besides comparing the individual height of each course, and the number, with the whole height of the room independently ascertained; as likewise did Mr. Inglis afterwards, with the same result (see vol. ii. p. 305);

¹ Sir Robert Ainslie’s *Views of Egypt*, 1840.

and we may even venture, therefore, to state the right designation of the chamber to be 'the chamber of five,' or sometimes 'the chamber of the standard of fifty.' True, there are not also five courses in either ceiling or floor; but there are four walls or vertical sides against those other two sides, and these two are *irregular* in the number of courses or joints they do possess. That is, the floor consists, it may be said, of six courses, or stripes of stones crossing the room from north to south; and the ceiling, of nine large beams; but the widths of both floor-courses and ceiling beams are unequal taken consecutively, or in any other way; and have therefore not had the attention bestowed on them, that was eminently paid to the wall-courses, in bringing out the idea of number and regularity of *division*.

The walls, indeed, are in this respect deserving of most particular notice; for, with one exception, presently to be described, every one of their courses is of equal height with every other, and runs round and round the room at the same height; just as, in so far, well and eloquently described by Professor Greaves. Such an arrangement, too, being not only quite different from the ordinary Pyramid masonry, —where, if the purpose was to build a wall of so much area, the builders looked little or not at all to the regularity in size or shape of the stones, so long as the joints were good, and the surface-planes even —(sufficiently demonstrated both in the walls of the Grand Gallery, and in the pavement, according to

Howard Vyse, besides the neighbouring instance of the walls, both limestone and granite, of King Shafre's tomb),—not only different, we say, from the ordinary Egyptian mason's ideas of what need, or should, be done in mere wall-building, but a thing especially difficult and expensive to realize in *granite*. This is on account of the hardness and amorphous character of that material, causing the quarries seldom to yield two blocks of the same size or shape; wherefore, the expense and waste of trimming a continued length of more than 6000 inches of granite blocks, near 50 inches broad, to a uniform height, must have been immense; and not to be undertaken by any one,—certainly least of all by sage, religious-minded men,—without some very peculiar and important reason.

But there is an anomaly, as already hinted, affecting the equal vertical heights of all these courses; for they are each 47 inches high, except the lowest,—which is 47 less 5, or 42 inches only. More apparent, may be considered this difference, than real; for it is only an effect to the eye, caused by the granite floor being introduced within, and up within, the granite walls of the chamber by the amount of five inches;—the blocks of this lowest wall-course itself, when examined at the sides of a hole at the north-west angle of the floor, being seen there to be *really* 47 inches high, like the rest. But still, why even that apparent anomaly; why that too visible breaking in upon the other-

wise perfect symbolization of five pervading the entire room?¹ (See Plate XIII. vol. ii.)

The following consideration may have something to do with the reason; especially when we remember that the five-inch space concerned, though quite an unmeaning fraction when measured in terms of the profane Egyptian cubit and its subdivisions,—becomes a most peculiarly Great Pyramid quantity, both with reference, 1st, to the length of the earth's polar axis, 2d, to the *number of inches* which it, the five-inch space, contains, and 3d, to its actual fraction of the sacred cubit of the Pyramid and the Israelites; viz., a fraction of 1-5th. The coffer stands on the floor, amongst the stones of that lower course of the four walls, like a small vessel within a larger one of the same capacity-measuring kind, but of a higher order; what proportion then, does the one bear to the other, in cubical capacity?

The length of the room, by our measures, is 412·55 British, = 412·14 Pyramid inches; the breadth, 206·30 British, = 206·09 Pyramid inches; and the corrected, and by the Pyramid builders corrected, depth of that lower course is about 42 inches. About only, is all we can say, so lamentable are now the dislocations of the floor blocks; for, though described as admirably smooth and level in

¹ Over the doorway, inside, the five courses of the north wall are interfered with for a small space, by two of them joining into one, to form a stout roof-block for the said door; but that is a constructive requirement, only to be looked at for a moment, to be allowed at once without prejudice to the chamber's whole idea.

Howard Vyse's time, they now vary an inch and six-tenths in places; and give, on a mean, of ten points measured, a depth for this course, of 41·84 inches; but indicating, that a majority of high places had been needlessly taken, and that the true mean of the whole would have been between 41·84 and 42·0; say, 41·9 Pyramid inches. Then—

$$412\cdot14 \times 206\cdot09 \times 41\cdot9 = 3,558,899 \text{ cubic inches,}$$

$$\text{and } \frac{3,558,899}{50} = 71,178.$$

Now, inasmuch as the 1·50th of the cubic contents of that course, if left by the builders at the uncorrected, or original depth of 47 inches,—would have been 79,842 cubic inches,—we may see that their correction of that one element, by an even quantity of the Pyramidally characteristic 5 inches in ‘the chamber of five,’ has at once brought out a result almost exactly fifty times the cubic contents of the coffer proper, or 71,250.

The result, too, may originally have been somewhat closer; for, as the walls of the chamber do not now present such marvellously close joints as many old authors have described—(‘it is really impossible ‘to force the blade of a knife between the joints; ‘this has often been related before, but we actually ‘tried the experiment, and found it to be true,’ says Dr. Clarke in 1801; whereas, now, some of the joints rather gape in our photographs of them in 1865);—we may expect some small alterations of the interior size of the chamber to have occurred

in the direction of enlarging it, at least in length and breadth. Assuming, then, the original measures to have been laid off in *even* Pyramid inches, and taking the nearest inch always to what the respective parts measure now, we find that—

$$\frac{412 \times 206 \times 42}{50} = \frac{3,564,624}{50} = 71,292.$$

Or actually closer than before, both to the measured contents of the coffer, and the theoretically deduced value it should possess, as the Pyramid standard of weight and capacity.

Hence the chamber is constructed commensurably to the coffer, and the coffer to the chamber, with fifty and five as the ruling numbers. But there exists even more testimony of this sort, identifying the *whole Pyramid* also, with the coffer and its chamber; in a quarter too where I had certainly never expected to find anything of the kind, viz., the component courses of masonry of the entire building.

Place of the King's Chamber in the Pyramid.

These grand courses, which are seen so prominently on the outside of the Great Pyramid in the present day, from having had their once outer covering of casing-stones stripped off, are—as often described—rude and rectangular. Yet though rude even to barbarism, if intended for outside work, they are strongly and consistently built; for not only is cement used abundantly in every joint, and the break-joint well managed, but the stones are keyed

and wedged into each other, so that hardly can one be extracted from the mass, without being first broken in pieces, (a feature which should be well weighed beforehand by any one who rashly proposes to 'drive tunnels right through every part of the 'Pyramid;') and then all the stones of each course, are arranged in admirably horizontal layers, extending for certain all around, and apparently also, through, the whole Pyramid.¹

The French *savants* early noted the faithfulness with which every component course of stone was carried at the same thickness round every side of, and by inference through, the Pyramid; but they also remarked the large irregularities which often and even generally occur amongst *successive* courses. So likewise must have, almost all travellers who ever ascended the Pyramid; though why those gentlemen busied themselves so frequently in counting the number of the courses, does not appear; especially as they were content to vary from each other between 206 and 255,—as see the accounts of travellers throughout the last two centuries.

In some places, the present visible contour of the courses is rather interfered with by debris; but

¹ A single case of discrepancy appears at the north-east angle, where a part of one of the courses is broken in upon by a double layer; but on close examination, that small top layer is found to be merely a making up of a 'left part' of the standing rock to the same height as the course of masonry proper. There are also instances in the measured courses, of two thicknesses of stone being occasionally employed in place of one; but that is positively to keep up the full thickness of the whole course; and can be distinguished from two small courses by following the run of the platform for some distance.

towards the west side, of the south-west angle, it is freer than elsewhere; and one may contemplate from below, and at a distance, the formation of the courses, under various angles of solar illumination, with eminent advantage. This I used often to do; and over and above special anomalies in single courses, noted the rate at which the whole of the courses gradually decreased in thickness, with their height, up the Pyramid side.

Thus, near the ground, they were very large, and gradually diminished in size as they ascended, with some few minor variations. But at the thirty-sixth course from the bottom, all of a sudden a much larger series of courses begins; *i.e.*, larger than the very small size which the original ones had gradually dwindled down to there. One could fancy an overseer coming to the men at that stage, and telling them that they had contracted the size too rapidly, and must enlarge again; or, that a new series of quarries had been opened, yielding larger blocks than the older ones. But whether the alteration was voluntary or accidental, it is equally plain that unless it *had* been introduced, there would have been above that point a larger number of courses in the Pyramid side than what now obtain; and in such case, there would not have been found the peculiar commensurability which seems actually to exist and cannot be altogether accidental. For on referring in vol. ii., and Division 1. of vol. iii., to all available measures of the individual heights of the courses on one hand, and

comparing them on the other with all determinations of the level of the King's chamber floor,—it will be found, that the fiftieth course of the whole Pyramid from the pavement upward, is practically identical with the floor of that already remarkable chamber. Or, such fiftieth course forms the plane, on which stands the mysterious coffer,—making use of a standard of 50 inches, in its tank of 50 times itself, in the chamber of five, or the chamber with walls in five courses, and with the symbol of five inscribed over its entering doorway. The mensuration numbers, with their errors, are as follows,—

Fiftieth masonry course, vertically above Pyramid's pavement, as measured by—

MM. Jomard and Cecile, in A.D. 1800,	=	1675	British inches.
MM. Le Père and Coutelle, . . . 1801,	=	1696	„ „
C. Piazza Smyth, in April . . . 1865,	=	1686	„ „
Messrs. Aiton and Inglis, in May 1865,	=	1702	„ „

Mean height, = 1690

Floor of King's chamber above Pyramid pavement, as measured by—

Howard Vyse and Perring in . . . 1837,	=	1665	British inches.
C. Piazza Smyth in April . . . 1865,	=	1680	„ „
Aiton and Inglis in May . . . 1865,	=	1720	„ „

Mean height, = 1688

Thus the Pyramid itself *appears* to be closer in these two elements, than are the observations of any two modern observers on one and the same element; and shows a point where future scientific men may usefully distinguish themselves, and redeem at the same time the modern exactness and

power both of physical science and instrumental investigation.

Meanwhile the case, so far as now proved, fully joins the other metrical phenomena ; and enables one to say that there is more, and even far more, than accident—in having come again and again, in connexion with this chamber, upon these constructive allusions which it makes, to fives and fifties *in accordance with the scientific theory of Pyramid metrology*. And this too, although its more ostensible commensurabilities, so far as made out by Sir Isaac Newton on Greaves' measures, had nothing to do with five or ten, but only with the profane cubit of Memphis, and its division into six and twenty-four, or, according to some, into seven and twenty-eight, parts. Hence we seem to be fully justified in condensing a practical conclusion of the whole, in the neat, and, so to speak, Pyramidal form, in which it enables a small standard of Great Pyramid *weight* to be described, but with a noble reference to universal weight, and capacity, measure. For, if the weight of the whole, original, coffer's contents of water (at the temperature of 68° Fahrenheit) be divided by fifty times fifty, there is produced what may be called a pound weight of the Pyramid ; and which can be referred to, or scientifically checked anywhere all the world over, in weight, as, ' 5 cubic inches of the earth's mean density.'

The arrangements of this most cosmopolitan

standard, to form a practical system of weight and capacity measures, are expressible thus,—the intervening multipliers or divisors being understood to be arbitrary, except in so far as they accord with the already established Great Pyramid numbers and proportions :—

PYRAMID WEIGHT MEASURE.

				Earth's mean density, substance of, in Pyramid cubic inches.
Unit	=	1 grain,	. . .	= 0.0005
100 grains	=	1 dram,	. . .	= 0.05
10 drams	=	1 ounce,	. . .	= 0.5
10 ounces	=	1 pound,	. . .	= 5.0
10 pounds	=	1 stone,	. . .	= 50.0
10 stones	=	1 cwt.,	. . .	= 500.0
25 cwt.	=	1 ton,	. . .	= 12,500.0
50 tons	=	1 rock,	. . .	= 625,000.0

PYRAMID CAPACITY MEASURE.

				Sacred Hebrew Standards. (Vol. II. p. 470.)	Pyramid cubic inches of bulk.
Unit	=	1 drop,	. . .	=	0.00285
100 drops	=	1 spoon,	. . .	=	0.285
10 spoons	=	1 glass,	. . .	=	0.85
10 glasses	=	1 pint,	. . .	=	28.5
10 pints	=	1 gallon,	. . .	=	285.0
10 gallons	=	1 bushel,	. . .	=	2,850.0
25 bushels	=	1 coffer = 1 ark, or laver,		=	71,250.0
50 coffers	=	1 keel = 1 'molten-sea,'		=	3,562,500.0

RELATIONS OF PYRAMID CAPACITY, AND WEIGHT, MEASURE.

1 drop of water, at temp.	=	68° Fahr., in weight	=	1 grain.
1 spoon	„	. . . . .	„	= 1 dram.
1 glass	„	. . . . .	„	= 1 ounce.
1 pint	„	. . . . .	„	= 1 pound.
1 gallon	„	. . . . .	„	= 1 stone.
1 bushel	„	. . . . .	„	= 1 cwt.
1 coffer	„	. . . . .	„	= 1 ton.
1 keel	„	. . . . .	„	= 1 rock.

The relations again of these Pyramid weights and measures with the British Imperial system, at their most important points of connexion, are—

FOR WEIGHT.

1 grain Pyramid,	. . .	=	0.988 grains, old English.
		=	0.720 " new English.
1 pound,	. . .	=	1.025 pound avoirdupois.
1 cwt.,	. . .	=	0.915 cwt. "
1 ton,	. . .	=	1.148 ton "
		=	0.956 ton, shipping.

AND FOR CAPACITY.

1 drop Pyramid,	. . .	=	0.792 drop apothecary's.
1 pint,	. . .	=	0.987 old wine pint.
1 gallon,	. . .	=	1.031 gallon imperial.
1 coffer,	. . .	=	1.007 of four quarters imp.

Determination of Weights on the Pyramid system.

Much importance is usually attached among metrologists, to an easy method of determining weights from linear measures; and the English arrangement has been much decried on this particular point, in comparison with the French. But the Pyramid system appears to combine most of what is advantageous in either, with some merits that are peculiarly its own.

For, the number of cubic inches in any mass having been obtained,—its weight in lbs., is simply 1.5th of that number: or, if the bulk has been worked out in cubic cubits,—its weight in tons, is the same as the number of such cubits with 1.4th more

added to them.¹ That is, the weight will be so many pounds, or so many tons, respectively, if the quality of the substance as to density be like that of the mean contents of the whole earth; but if it be of the heavier, as gold, or the lighter, as water, an alteration must be made accordingly; or, in short, a table of specific gravities must be referred to, as with the English, French, or any other system.

The usual tables, however, at present most frequently met with, are arranged in terms of water as unity; except, indeed, the astronomical, which have long used the more exalted Pyramid unit, of the earth's mean density. We may therefore appropriately conclude this section, by an example of a general table of specific gravities, arranged to suit the requirements equally of the ancient Pyramid metrology, and the most advanced modern astronomy.

SPECIFIC GRAVITIES.

Earth's Mean Density, = 1.

COSMICAL.

Sun,	0.25	Mars,	0.95
Mercury,	1.12	Jupiter,	0.24
Venus,	0.92	Saturn,	0.14
Meteoric stones,	0.61	Uranus,	0.24
Meteoric iron,	1.23	Neptune,	0.14
Earth,	1.00		

¹ Conversely, the weight of a body being given, to find its cubical measure,—multiply the pounds-weight by five, for the number of cubical inches; and decrease the tons-weight by 1.5th, to find the number of cubic cubits.

TERRESTRIAL.—(*Specific Gravities.*)

Cork,	0·043	Aluminium,	0·460
Poplar wood,	0·067	Red granite (Peterhead),	0·464
Larch wood,	0·095	Red granite (Great Pyramid),	0·479
Honduras mahogany,	0·100	Bottle glass,	0·480
Lithium,	0·100	Diorite (Great Pyramid),	0·484
Pitch-pine,	0·116	Jasper,	0·494
Beech-wood,	0·122	Basalt (mean of 3 varieties	
Riga fir,	0·132	from near Great Pyramid),	0·500
Spanish mahogany,	0·150	Arragonite,	0·517
Potassium,	0·150	Flint-glass,	0·584
Wax,	0·158	Diamond,	0·618
Tallow,	0·166	Sapphire,	0·701
Oakwood,	0·170	Ruby,	0·751
Sodium,	0·170	Arsenic,	1·01
Distilled water,	0·175	Chromium,	1·04
Sea water,	0·180	Tellurium,	1·10
Water from Dead Sea,	0·218	Cast antimony,	1·18
Lignumvitæ,	0·234	Cast zinc,	1·26
Calcium,	0·280	Cast iron,	1·27
Bone of an ox,	0·291	Cast tin,	1·28
Magnesium,	0·310	Bar iron,	1·36
Ivory,	0·320	Hard steel,	1·37
Graphite or plumbago,	0·340	Cast brass,	1·47
Brick,	0·351	Cast copper,	1·54
Great Pyramid casing-stone,	0·367	Cast bismuth,	1·72
Glucinum,	0·370	Cast silver,	1·84
Gypsum,	0·381	Cast lead,	1·99
'Paving stone,'	0·424	Mercury,	2·38
'Common stone,'	0·442	Cast gold,	3·38
Strontium,	0·450	Hammered gold,	3·40
Desert sand from near		Pure platinum,	3·42
Sphinx,	0·454	Platinum, laminated or	
Flint,	0·455	beaten into leaves,	3·87

SECTION III.

STANDARDS OF HEAT.

INASMUCH as all known substances, both fluid and solid, vary in size and specific gravity with every

accession of imponderable heat, some definite temperature must be referred to, when dealing accurately with standards either of length, capacity, or weight; and thus it came, that many years ago, the British linear standards were referred for their zero of length to the temperature of 62° Fahrenheit, and the French metrical system to 32° of the same scale. Not indeed expressed by the French authorities in that scale, for they refused to be bound, as the English so easily allowed themselves to be, by the whim of the Dutchman Fahrenheit; and perceiving early the intrinsic connexion between heat and other subjects of metrology, they, the French authors of the metrical system, very wisely made their subdivisions of the great natural unit of heat, conformable to their other decimal arrangements, whence their now celebrated Centigrade scale of the thermometer, having 0 at the freezing point, and 100 at the boiling point of water.

In practice, indeed, some unexpected difficulties were found in the way of realizing, as a heat referring point, the 0° of their scale for all the French standards of measure; and in the same searching furnace of practice, the British referring point of 62° Fahr., has been somewhat departed from in its full integrity and simplicity. Yet, inasmuch as the necessity of referring any and every part of metrology to something definite on the water-scale of heat, has rather grown, than lost, in importance in the eyes of modern philosophers, with all this increase of

perplexity and trouble,—more attention than ever must be paid to its ultimate refinements, in any system which may hope to continue before the world. Let our first inquiry therefore, at the Pyramid be, whether it possesses *any* heat-reference for its standards of measure?

No indications, indeed, of a thermometer of any acknowledged kind, are to be seen in the Great Pyramid; but a little reflection will soon show the attentive visitor, that the whole building forms in itself a something more important still, towards attaining success in carrying out practically, even the most refined operations of metrology; for the Pyramid's enormous mass of solid, and slow conducting-of-heat, masonry, at whose overwhelming amount the world has hitherto merely wondered, or jeered, or inveighed, or abused, must have the useful and inevitable effect of remarkably equalizing the temperature on anything, as the granite coffer, contained within its substance.

The *linear* standard, it is true, does not seem to have that protection; for, being the length of one side of the base of the Pyramid, and defined by the corner-sockets, it depends not so much on the building, as the natural rock of the hill. But there, we presume, that not the most critical geodésists of the present day, would pretend that any season temperature correction could possibly be required; for in all their own practice, whenever they have measured base lines directly, or trigonometrical lines

indirectly, on any part of the surface of the earth, whether by day or by night, summer or winter, or even year after year, they have never considered any reduction for variations of temperature admissible or sensible : the variations felt on the surface, being supposed to be merely skin-deep, over a uniform heat below, and unable to produce any mechanical alteration of size.

Equally then, at the Pyramid, must the linear standard, seeing that it is not a loose bar of brass, but part of the earth surface,—be considered by the involuntary testimony of all modern geodetical practice, to be invariable in the temperature which governs its size ; and whatever that temperature may be, the capacity standard is bound to the same,—by being surrounded and covered in, in its place in the King's chamber,—with so huge a mass of nearly solid building,—that variation of season, cannot be felt within its interior. A necessarily constant and therefore definite temperature, exists for each of the Pyramid standards ; and, in so far, they can be introduced worthily amongst the most perfect inventions of modern science towards the same end,—*if* we can discover what that definite temperature is ; and if, also, there be anything about it, either in amount or character, indicative of design in the builders, or desire on their part to have obtained that particular temperature, rather than any other ?

Now here, is one of the most curious parts of the whole Pyramid question ; for, on referring to the

French observations of temperature in and out of the Pyramid, they will be found to indicate that the temperature is close to 68° Fahr., or what might be called a temperature of 1-5th; that is, 1-5th the distance between the freezing and boiling of water, measured upwards from the freezing point. And if that quantity be further supposed to be divided into fifty parts,—suitably with the 50-inch standard referred to for weight and capacity measure in the chamber of *five*, or the King's chamber reached by fifty courses from the ground,—then the whole distance between freezing and boiling will be represented by 250; while 1000 of the same degrees represent as nearly as it has been measured, or given out by the 'Diffusion of Useful Knowledge Society,' that very notable physical point in the temperature scale, where heat begins to give out light, or iron is seen to be red-hot in the dark.¹

All these numbers, then, are eminently coincident with the divisions and subdivisions of the rest of the Pyramidal metrology; while the reference to an earth temperature, viz., that of the Pyramid hill, depending chiefly on its parallel of latitude, and expressed only, but not regulated, by the accurate mensuration afforded in the physical nature of water,—is perfectly suitable to the principle already shown to have been followed in capacity and weight measure; or that of employing for their regulation

¹ Diffusion of Knowledge Society's *Natural Philosophy*, vol. ii. p. 63.

the whole earth's mean density, but for their practical expression, water. Hence, *design* will be begun to be indicated in the temperature arrangements of the Pyramid, if the heat point of 68° Fahr. be really found to prevail there, on further measures being obtained than the few and scanty French ones¹ already alluded to.

The first and most definite inquiry, therefore, to be made with this view, is to ascertain the temperature of the King's chamber; and the moment that was made by myself, and equally whenever it was made (see the observations in vol. ii. p. 207), extending from 19th January to 1st April, the temperature came out, not 68° , but closer to 75° Fahr.

Of this there was no doubt whatever, for variations of two or three tenths of a degree are not worth talking about in presence of 7° . Was the whole proposition, therefore, negatived? By no means, as yet; for what feature of the Pyramid is there, which renders at once by measurement, in the present day, its ancient proportions? None; seeing that in every case the first measure only gives us the original building *plus* (perhaps I should say *minus*), some awful amount of dilapidation, destruction, or alteration, and which must be immediately inquired into as to its numerical effect. So it is with the heat question; and the first anomaly to

¹ The temperature is stated by M. Jomard and Colonel Contelle to have been 22° C. in the King's chamber, 25° C. in tombs outside, and 17° or 18° C. in Joseph's Well at Cairo.

force itself on the attention of a careful observer is, the finding that while the King's chamber marks 75° ; the Queen's chamber below, marks 74° ; and the well mouth, lower still, marks 73° .

'Ah!' then might even an untutored countryman easily see reason enough to exclaim, on finding,—in such a latitude and elevation above the soil,—mean temperatures *decreasing with descent*, and all of them too great; 'Ah! there is a centre of disturbance up here aloft, and prevailing to a larger extent in the King's chamber than in lower parts of the building; the cause of it must be searched for without delay.'

One source of the anomaly is without any doubt the daily visits of numerous parties of travellers, with their multitudinous Arabs, all of them supplied with lighted candles, and abounding in animal spirits, dancing their hornpipes 'over King Cheops' 'tombstone,' banging the coffer for accompanying music, and throwing off waves of heat all the time; which heat-waves, first entering the air of the chamber, and not being able to escape thereby, as the ventilating tubes are *now* choked up,—must infallibly affect the walls. But as these walls are 170 feet thick, no sensible carrying away by conduction or radiation from their outer surfaces can possibly take place; and there seems no other eventuality in store, than a continual rising of temperature in the King's chamber, so long as these ceaseless evolutions of imported heat of a higher temperature take

place, and no counteracting effect can gain admittance. Even when a small party had visited the chamber on one occasion, March 25, I found after they had gone, an increase of 0.4° in a thermometer inside the hole of the northern air-channel; and, more notably still, when I was, although *solitarily*, watching for three hours, yet in the confined space of the forced passage intercepting the northern air-channel further on,—and representing therefore more nearly the effect of a large party almost filling the King's chamber,—the thermometer rose 3.6° , or to 78.2° Fahr.

Hence a likely remark that an observer, seeing and feeling all these things, may probably make, will be, 'What a wise idea and necessary institution ' those air-channels of the ancient builders must ' have been, to keep up equality of temperature inside the Great Pyramid; or rather to prevent ' disturbances to the said equal temperature accruing. For, if living men were intended and expected ' to visit the inside, nothing but a current of air ' could efficiently carry away the doses of heat they ' would involuntarily throw out, so long as they ' were there; and which doses, if not bodily carried ' away, must go on, in such a locality, perpetually ' accumulating.' Important of course that the air-channels should not be too large, lest the heat of a summer's day and cold of a winter one should thereby enter too freely to the central apartment of the Pyramid; but on comparing the smallness of

the bore and length of stone channel of these air-tubes of the Pyramid, with the similar elements of culverts in the new Palace of Westminster,—and allowed there, on the testimony of critical examiners, to give something very like the mean temperature of the year, to air passing through them, even on the hottest summer's day,—there seems to be abundant, and even superabundant, security that the same controlling effect will be exercised at the Pyramid.

When Colonel Howard Vyse opened both of the air-channels in 1837, he speaks of 'the sudden rush of air that took place,'—indicating pretty clearly the anomalous state of temperature into which the King's chamber had previously grown, during the long closing of these important channels. And had he observed thermometers then, and at frequent intervals subsequent to his successful unlocking of the vents,—he would have found the extra heat draining away, from day to day, just as the waters of the great Ethiopian lake are reported to have done, when their northern barrier was broken through in the days of Joseph's patron king, Phiops, Aphophis, or Apappus. But what thermometrical point the chamber would have lowered down to, at least by this process of merely drawing off the extra heat, or to what point it was lowered before the air-channels were again stopped up,—is very difficult to say; and though the world is now so much increased in wealth, it may be long before another equally liberal-minded man to Colonel

Howard Vyse will be found, to undertake the clearing out of the air-channels once more from the mischievous quantities of sand and stone thrown into them; and allow of the temperature experiment being tried again, and this time more fully and scientifically.

In the dearth, however, of such opportunities, we will venture our own opinion, that the lowering would by no means amount to the 7° required to reduce the 75° at present observable, to the 68° of the hypothesis; and because, a part of the anomaly is due to another source, and one equally unintended by the original builders,—viz., *the practical absence of watery vapour*. The climatal effect of this most important natural agent has been well entered into by Principal Forbes, in his paper on Mean Temperatures, in the 22d volume, part 1, of the *Transactions of the Royal Society of Edinburgh*; and with the effect of showing, from an inductive examination of the relations of mean temperature, latitude, and the relative proportion of land and sea in a given parallel,—that there would be in latitude 30° , an increase of 19° Fahr. in the mean temperature, were the surface made entirely of land, in preference to entirely of water.

Now, though we all know that neither the globe nor the parallel of 30° north, is composed entirely of land, yet the region about the Pyramid speaks more of desert than of ocean; and besides that, in confined localities, as inside any of the tombs, and

even over definite tracts of the desert,—caused by the hold of the ground upon the air, and the not *perfect* mobility of the latter,—there are some very close imitations occasionally found of the temperatures proper to a globe without water. Hence it is, that temperatures higher than 68° , as 73° and 74° , are found even in the well of the Great Pyramid, in the sepulchral chamber of the second Pyramid, and many other localities not visited by very large numbers of travellers or Arabs. But all these temperatures come within, and abundantly within, the limits assigned by Principal Forbes to 30° of latitude north, on either the total land or total water hypothesis, *i.e.*, between 80.9° and 61.9° ; while they would also be infallibly reduced somewhat, and in the direction of 68° , if an evolution of, and ventilation by, watery vapour were freely allowed in their vicinity; and an approach thereby made to the natural circumstances of the parallel as a whole.

That, on one hand, the builders intended watery vapour to be present, may be assumed; first, from the part which water plays in the capacity measures of the coffer; second, from the existence of the lower well, which, though in commencement only, descends from the floor of the subterranean chamber straight down *towards* the well-water level of the region, even as the square well of the sepulchral chamber in King Shafre's tomb does descend to, and reach, it; and third, from the fragments of tradi-

tion gathered by Herodotus and others as to the tomb of King Cheops, the builder of the Great Pyramid, being at the bottom of the structure, *on an island surrounded by the waters of the Nile*. And that, on the other hand, by such introduction of the Nile waters into the lower parts of the Pyramid, the temperature of the hollow portions of the upper part of the building (communicating by open passages with the lower), would be brought to something exceedingly close to the temperature of 1-5th, or 68° Fahr., may be concluded from several sources.

First, general earth observation and physical theory.

These are given well in Principal Forbes's paper, already alluded to; the observations being the extensive collections of all countries made by Professor Dove of Berlin, and the theory,—Principal Forbes's physical theory,—connecting them all together; and they give, for the mean temperature actually existing in 30° of latitude north, the former 69.8° , and the latter 69.4° . The reduction of these quantities to the latitude of the Pyramid, or $1^{\circ} 10''$ south of 30° , is practically insensible, amounting only to 0.015° Fahr.; but their reduction from the sea level, at which alone they apply, to the elevated position of the Pyramid at its base, or 2580 inches there above, is much more important, and unfortunately rather uncertain; for though in our own country, say in latitude 53° , the decrease of temperature with elevation has become pretty well ascer-

tained to be, at the rate nearly of 1° for every 3312 inches of height from the surface of the earth,—a much more rapid decrease may be expected in a latitude of 30° , where the surface is exceedingly heated by continual sunshine, while the streams of the atmosphere over it, must present a balance of many, and more shaded, latitudes. The only observation, too, which I was enabled to make bearing on this point, viz, one between the minimum temperature simultaneously of East Tombs and the summit of the Great Pyramid,—shows the rate exceedingly greater, or 1° for every 1000 inches of ascent; but that is probably exaggerated, for the mean temperature at least; and the result we are therefore brought to for the mean temperature of the base of the Pyramid, as derived from both general earth observations and approved physical theory, is something between 69.0° and 66.9° ; the mean whereof *happens* to be, 68.0° Fahr.

Good observations for mean temperature at the Great Pyramid itself, would of course be preferable to these deductions from observations taken in every other part of the world except the Pyramid; but such observations are wanting, for no person capable of observing has ever stayed there long enough. My own observations bear on the question no doubt, but, extending over only a third part of the year, cannot be employed without an uncertain reduction of the first four, to the whole twelve, months. Let us see, however, what they indicate.

The atmospheric observations (vol. ii. p. 265) taken daily by self-registering thermometers, give for the simple mean of maximum and minimum thermometers (a very usual, though not perfectly accurate method), $64\cdot6^{\circ}$ for the period in question ; while the discussion of the hourly observations taken once a week during the same time, and safe from some of the sources of error to which the minimum thermometer was exposed, give $63^{\circ}\cdot4$. Wherefore, doubling the weight of this result on account of its instrumental superiority, the best mean result deducible from both methods would seem to be, $63\cdot8^{\circ}$ Fahr.

Then for the reduction of any number obtained during the four months employed, to a whole year, the following data have been collected from the following sources :—

Date.	Place.	Latitude.	Reduction of mean temp. of first four months, to the whole twelve months of the year.	Authority.
1856-1865	{ Towns of } { Scotland, }	$56^{\circ} 12' N.$	Fahr. + $6\cdot9^{\circ}$	{ Meteorological Society of Scot- land.
1840-1851	Dublin,	$53\ 23\ ,$	+ $6\cdot0$	{ Rev. H. Lloyd, D.D.
1853-1855	Malta,	$35\ 54\ ,$	+ $10\cdot0$	{ Royal Engineers and Military Medical Staff.
1862	Bombay,	$18\ 54\ ,$	+ $2\cdot8$	{ Bombay Obser- vatory Volume.
1848	Aden,	$12\ 46\ ,$	+ $4\cdot4$	{ Col. Sykes, <i>Phil.</i> <i>Trans.</i>

Some of these numbers we fear are not so accu-

rate as they might be, for one set assumes that observations at 9 h. 30 m. A.M., and 3 h. 30 m. P.M., necessarily give the mean temperature of all the instants composing 24 hours,—whereas it will be seen from our table of hourly corrections (vol. ii. p. 261), that these instants are both in excess, one of them, indeed, very near the time of maximum solar influence; and the other observers have seldom noted more than the simple points of maximum and minimum, the latter marked on a thermometer not so sensitive as what is employed for the former. Taking, however, from them all a positive correction of $+6^{\circ}$, for the seasonal effect, and an elevation effect of -1° from our own experience to reduce from the meteorological station to the Pyramid base,—we have for final result, and as deduced from local atmospheric observations, 68.8° for the quantity sought after; in place of 68.0° even.

And lastly, referring to the well temperatures, which are often thought to give at once the mean temperature of a country without further trouble, the mean of twelve observations (see vol. ii. p. 202) of Cairo wells gives 69.9° ; of ten observations of agricultural wells in the alluvial flat opposite to the Pyramid, 69.1° ; and of six in King Shafre's tomb-well, closely approaching in position, age, and character, any water well in the Great Pyramid, these give 64.6° Fahr.

The further small corrections which these raw observations may require for season and elevation,

I will not attempt to inquire into, with the scanty means for that purpose at my disposal. When, too, we find that every result, whether from theory, atmospherical observation, or well-water observation, oscillates closely upon the temperature of 1-5th, or 68° Fahr.,—it is probable a long series of measures would have to be carried on daily, and for many years, before any one could decidedly say from local data alone, whether the true quantity is below or above that peculiar point.¹ In the meanwhile, however, it is most likely plain to every one, that both watery vapour and hypsometric elevation are required in the latitude of the Pyramid, to prevent the actual mean temperature being too high: or, these things being given, that a very different latitude from 30°, could not have been fixed on for the Pyramid with any appearance of a temperature of 1-5th; the mean temperature of 20° north latitude being no less than 7·5° greater, and of 40° north latitude 12·3° less, than for 30° north latitude, according to the general collection of observations and the theory, already mentioned.

Hence, compared both with nature, and the modern European scales of temperature, the assumed, and apparently the real, Pyramid scale of temperature reads as follows:—

¹ The annual mean temperatures by observation at fifty-five stations of the Meteorological Society of Scotland were, in 1856, = 45·7°; in 1857, = 48·0°; in 1858, = 46·6°; in 1859, = 46·8°; in 1860, = 44·5°; in 1861, = 46·9°; in 1862, = 46·9°; in 1863, = 46·8°; in 1864, = 45·5°; and in 1865, = 46·9°.

	Pyramid Scale.	Fahrenheit Scale.	Centigrade Scale.	Réaumur Scale.
Iron bright red in the dark,	1000°	752°	400°	320°
Water boils,	250°	212°	100°	80°
High summer temperature at Great Pyramid,	100°	104°	40°	32°
Mean temperature at Great Pyramid,	50°	68°	20°	16°
Water at maximum den- sity, nearly	10°	39·2	4°	3·2
Water freezing,	0°	32°	0°	0°

Second part of the Heat question.

As already indicated on p. 178, so insidious, multi-farious, and difficult are the actions of heat, that the originally simple references of both the British and French systems have rather broken down in practice ; and exhibit now, how vain are the efforts of man to set his own rules to nature.

Thus the British idea of referring everything metrological to 62° Fahrenheit, is generally ignored by all Englishmen in their measures of specific gravity, where the more even number of 60° Fahrenheit is preferred ; sundry references too are made to the density of water, by some at the temperature of 39·2° Fahrenheit, and by others at 40° Fahrenheit ; while more recently still, the copies of the standard yard made under Government supervision, if found too long or too short at the standard temperature of 62°, are issued, under authority, as being of the correct length at some other temperature—as 59°, 63°, 65°, or whatever the individual case of linear error

may require, according to the expansion of the material from heat.

In the French philosophers' system, again, it was thought to be a magnificent idea at first, to have declared the freezing temperature of water *their* heat referring point; because, there was then no dependence on any thermometer. But though such a temperature may answer with permanent solids, it is very inconvenient, and something worse, when using these in combination with water to obtain the French unit of weight; and in fact, for that purpose, the water had to be raised in temperature, until it had ceased the anomalous expansions it indulges in on approaching the crystalline state, and had acquired its condition of greatest fluid density somewhere between 39° and 40° Fahrenheit.

A thermometer, then, must be employed after all to get the expansions of the solid vessel, holding the water, between 32° and 40° Fahrenheit; and neither of these two temperatures are found agreeable or conducive towards good measures being obtained by man. For not only does man, as a warm-blooded animal, use his faculties to most advantage in a temperature very much higher than that of freezing water; but there are pernicious effects to the instruments he is studying, when the difference of his own heat and theirs, amounts to a large quantity; such heat exchanges increasing at a very accelerated rate, with the simple increase of the differences between two neighbouring bodies. So important is

this consideration in some inquiries, that we have heard an eminent Indian geodesist hastily declare, that 'he would have his experimenting and instrument-making room heated up to blood-heat, say 98.4° Fahrenheit.' But then he soon after allowed, that such a temperature would be rather *too* high for his full purpose ; for though 98.4° Fahrenheit, *may* be the heat of man's interior, it is not that of his exterior and neighbourhood,—besides being, in the air breathed, too relaxing to both body and mind when at difficult work.

Lastly, too, we have to chronicle the inglorious termination of the French heat-referring point, for their solid and official metre ; for the said metre bar having been found too short by a very notable quantity, owing to an error in the triangulation of France recently discovered,—the freezing point has been given up, and that parent of all the metres is now referred to, as representing its intended length, only when it has been expanded by rising to a temperature of something near to 50° Fahr. An accidental temperature, in fact ; the accident of an accident ; representing nothing great in nature ; and liable to be altered again at any subsequent time, to some other accidental quantity, when a new error in the steps by which the metre was obtained, shall unhappily be discovered.

The friends of the French metre, either hush up this result ; or, affect to look rather too kindly upon it, and say,—'How beautiful that the French metre

‘ should be self-adjustible, and always show mankind, through means of more or less heat-expansion, the length of one-ten-millionth of the quadrant of the meridian passing from the North Pole through the city of Paris to the Equator.’¹ But supposing, or allowing to them, that it does so,—they must themselves confess, that they keep up their connexion with that one natural linear unit, and not the best of its kind in the world, by sacrificing their connexion with another unit of a different natural element, and not less important,—viz., the heat unit.²

If then, both the British and French heat references have failed, in practice, to hold men true to their ancient covenants with them,—is there any chance that the Pyramid reference, if tried, would fare any better?

We believe it would, and for the following reasons :—

¹ The friends of the metre are not often quite so clear in their statement of the fact,—for they delight sometimes, in referring the metre’s origin, even as a decimal scale, to ‘one of the great circles of the earth,’—when really only 1-4th part of such circle was ever attempted to be referred to,—and the decimal division cannot apply equally to both. Neither, again, do they often let their readers know, that late researches on the figure of the earth, have shown that quadrants of the meridian in the northern hemisphere, vary in length with their longitude; so that the length of the French quadrant is local and national only, not universal and cosmopolitan to all the nations of the earth. (See vol. ii. p. 450.)

² In the enlarged Natural Philosophy of the present day, expanded as it has been by the dynamical theory of heat,—questions of heat are more momentous to the prospects of life and energy, in and throughout the universe, than anything connected with a little more or less linear proportions.

1st, As a temperature of 1-5th, and marked by 50° on its own scale, it would have certain numerical advantages in arithmetical operations ; or, the evenness of the Centigrade, with the greater expressiveness of the smaller degrees of Fahrenheit.

2d, The temperature of 1-5th, or 68° Fahr., is most admirably adapted to human beings to breathe and labour in ; or literally for life and work ; feeling, as we have experienced again and again in Egypt, simply pleasant, fresh, and wholesome, without sense either of numbing cold, or oppressive heat ; and

3d, There seems a prospect of its being a vastly more important natural unit, than what has been hitherto mentioned ; and a something, therefore, which all men endued with sense, would be as careful how they altered, as they would be morally with regard to removing their neighbour's landmarks. We have hitherto, for instance, merely spoken of the temperature of 1-5th as being by nature, or art, or both, that of the Great Pyramid, in the particular spot of the earth where that building was set down ; but what will nations say if that temperature be, and that one place be found to have, the mean temperature of the whole surface of the earth ; and yet this may be inferred, at least to the degree of accuracy whereto modern observation enables us to proceed.

In some works, no doubt, and works much spread among the people, the temperature of 50° or 51° Fahr., is mentioned as that 'of the whole earth.'

Of the whole *surface* of the earth, may be presumed to have been meant ; for, if we were to take account of a molten interior, there would be an inconveniently high result for mankind to examine metrological standards in ; and climate, which is so important to man's well-being, is an affair of surface, and superficial influences on the earth, only. Even in this necessarily limited view of the case, however, the above authors seem to have mistaken a determination of the temperature in latitude 45° , or the middle point of a meridian *line along* the surface, for that of the area of the *whole surface* of the earth. The latter is of course the true reference, and the middle parallel in either hemisphere for *surface*, is by no means 45° ; but, if computed as a sphere, comes out 30° ; or the exact latitude of the Pyramid as already mentioned, all but the small defalcation of $1' 10''$.

Hence, the annual mean temperature of the parallel of 30° latitude, is more likely to be the mean temperature of the whole surface of the earth, than is that of 45° . But not necessarily with exactness ; for it must depend, partly on the rate at which the temperatures increase, or decrease, on either side of the parallel ; and also, on the difference of temperatures in the two hemispheres of the world. Of this last, indeed, very little is known as a whole ; for though in low latitudes, southern parallels are colder than northern, there is no necessity,—as Professor Dove has remarked,—that the same feature should still prevail in higher latitudes.

As a first approximation, then, let us take the northern hemisphere alone, and ascertain the temperatures both of 30° latitude,—which parallel evenly divides the *surface* between Pole and Equator,—and of the latitudes $48^\circ 35'$ and $14^\circ 29'$, which likewise evenly divide the surfaces between the Pole and 30° latitude on one side, and between 30° latitude and the Equator on the other.

The data for this purpose are extracted from Table III. of Principal Forbes's important Memoir, above quoted, and appear as follows:—

Latitude.	Temperatures, in degrees Fahrenheit.			
	Observations collected by Dove.	Theory by Forbes.	Forbes's Formula.	
			All land.	All water.
North.				
60°	29.8	27.5°	18.4°	37.4°
50	42.5	43.0	39.9	46.5
40	56.5	58.0	61.4	54.9
30	69.8	69.4	80.9	61.9
20	77.5	76.6	96.5	67.3
10	79.9	79.6	106.3	70.6
0	79.7	80.0	109.8	71.7

Whence we derive the mean temperature for latitude—

$48^\circ 35'$ Lat.	By theory, . . .	=	Fahr. 45.1°
30 0 "	" . . .	=	69.4
14 29 "	" . . .	=	78.2
And the mean, doubling the middle latitude co-efficient,			} = <u>65.5</u>

The first approximation, therefore, by doing little more than attending to the nature of the circum-

stances really concerned, when the *surface* of the earth is in question,—has brought up the quantity from the previously believed 50° to 65.5° Fahr., or within 2.5° of the 1.5th temperature; and the chief part of that comparatively small difference, may be suspected to arise from error in the theory employed, when computing for the northernmost latitude.

That there is such an error may be inferred thus: The mean temperature of Scotland, derived from fifty-five of the stations of its Meteorological Society, having a mean lat. of $56^{\circ} 30'$ north, and elevation above sea = 3072 inches, is for the period from

			Fahr.
1856 to 1857, or 2 years inclusive,	.	=	46.8°
„ 1858, or 3 years	„ . .	=	46.8
„ 1859, or 4 years	„ . .	=	46.8
„ 1860, or 5 years	„ . .	=	46.3
„ 1861, or 6 years	„ . .	=	46.4
„ 1862, or 7 years	„ . .	=	46.4
„ 1863, or 8 years	„ . .	=	46.4
„ 1864, or 9 years	„ . .	=	46.3
„ 1865, or 10 years	„ . .	=	46.4

Whence any one may clearly see, that the last quantity is not likely to be much altered by further observation with the same instruments and methods; in fact, that it is, with the above limitation, very well determined, and probably much better than the great majority of stations on which the theory is founded.

But that theory (see second column of above Table) makes the mean temperature of the parallel of $56^{\circ} 30' = 32.9^{\circ}$ Fahr.; or hardly raised above the freezing point; and in so far, is 13.5° in differ-

ence from the observed mean temperature of many years. Only in difference, though, not in error; because the theory attempts to represent that whole parallel, while Scotland only occupies one point of it,—and that point a locality, where ocean abounding over land, a something of the warmth of a water climate over a land one when north of latitude 45° , ought to be felt. To what extent though? The theory fortunately answers for itself, stating that, if the globe were ‘all water,’ and therefore the highest possible result obtained from that source,—the mean temperature of $56^{\circ} 30'$ north, and at the sea-level, would still be only $40\cdot6^{\circ}$ Fahr.; or no less than $5\cdot8^{\circ}$ below what actually obtains in Scotland, where, though there are complaints that the climate is very rainy, it is not all water yet.

Hence although the theory alluded to, is termed by its talented author the ‘rational theory,’ in contradistinction to Brewster’s and Mayer’s, which are ‘empirical,’ or ‘merely mathematical,’—and although it is decidedly in advance of theirs in taking into account the distribution of earth and sea over the land’s surface,—yet, either these have been erroneously estimated; or, as we rather believe, there are other important, though hitherto neglected, physical conditions to be taken into account, in deducing terrestrial mean temperatures. Whichever be the cause, the effect of the results being at last attended to by future investigators, will inevitably raise our previously deduced mean temperature of the whole

world's *surface* from $65\cdot5^{\circ}$, to something nearer, if not absolutely to, $68\cdot0^{\circ}$ Fahr., the standard 1-5th of Great Pyramid heat metrology.

SECTION IV.

STANDARDS OF ANGLE.

As men improve in science, or advance in the magnitude and importance of the subjects they apply themselves to,—angular measure, seldom heard of in primitive society, becomes one of the most important branches of metrology.

The pure mathematician, indeed, might go on for a long time, expressing all his angles in terms only of the whole circumference as unity, or in terms of the angle subtended by the arc which is equal to its radius; but the practical man, whether mineralogist, surveyor, astronomer, or many another professional, would seldom attain much accuracy, and would infallibly lose a vast deal of time over every determination,—unless assisted by some predetermined system of dividing the circle into small equal portions or degrees; and these arranged suitably with the prevalent arithmetic of the day. So thoroughly was this principle confessed by the *savants* of the first French revolution, that they altered the 90° , assigned from Greek-Alexandrine example, for the quadrant, to 100° —in order to

make a decimal, or centigrade, scale a pervading feature through the whole of their metrical arrangements.

But their 100° for the quadrant and 400 for the circle, have not taken with the world at large; wherefore, after some gallant efforts in the way of producing logarithmic tables, astronomical books, and angle-measuring instruments arranged on the 'centesimal' method,—the Parisian *savants* have reverted to the ancient 'sexagesimal' system, and divide once more their whole circle into 360° . Not, however, without the step having been pronounced by high authority in this country 'a calamitously retrograde one in the progress of science;' so many advantages are there in a centesimal over a sexagesimal arrangement, if properly carried out.

Although, then, at the present moment, the French metrical system is without an angular arrangement of its own,—its past history confirms our principle, of no metrology being complete which does not include *angle*. Now, at the Great Pyramid, so much of the importance of the questions discussed in vol. iii. Division I. turns upon very peculiar angles, and their remarkably close realization by the builders,—that a system of angular graduation may fairly be expected to have prevailed amongst them.

Against this idea, it is true, there immediately arises a class of antiquaries, declaring, that in the early day of the world's history when the building

of the Great Pyramid took place, men must have been so ignorant of true science, as to have had no idea of angle, as angular measure ; and that if certain *inclines* now appear in their work, it is because they are the hypotenusal, or joining, lines of the ends of certain horizontal and vertical lengths laid out in mere, and simple, linear proportions.

This statement has indeed been met by another, and from an antiquary of remarkable mathematical and philosophic attainments, too,—with the effect of showing that angle, as angle, is after all not so very recondite a matter, but that it might have easily occurred to intelligent minds in an early condition in the world. But it is rather our duty throughout this book, to take no theories of any kind about the Pyramids or their builders for granted ; and in this part of our labours, at least, to do nothing more than ascertain, what the measured parts say for themselves.

Now, in the Pyramid, there are, by observation, *two* dominant angles ; one of them that of the foot of the Pyramid, or ascent of the sides, = $51^{\circ} 51' 14.3''$; and the other the angle of the passages, or $26^{\circ} 18' 10''$ (see vol. iii. Division. I. p. 34). To the former, we might perhaps add the angle of the summit of the Pyramid, and the upper angle of a horizontal section through the sides,—but these being in reality only trigonometrical consequences of the other, have no separate scientific existence.

What proofs, then, can be produced, that the two sets of inclined lines which we have read off on our present European 360° scale, as $51^\circ 51' 14\cdot3''$, and $26^\circ 18' 10''$,—were derived from linear proportions?

The following is the best I have heard:—Two horizontal and one vertical, gives an angle of $26^\circ 33' 54''$; and twice that, is close to the angle of the foot of the Pyramid. Nay, but how close? Why, it makes $53^\circ 7' 48''$.

In the last century, $53^\circ 7' 48''$ might have passed as being *perhaps* the angle of the Great Pyramid's foot; but, since Colonel Howard Vyse's measures, and our own (see vol. iii. Division I. p. 28), we imagine that no other angle than $51^\circ 51'$, and some seconds, can be admitted. Similarly, too, on referring to our chapter on the passages (vol. iii. Division I. p. 38), it will be found that $26^\circ 33' 54''$, is decidedly outside the actual angle of *all* the passages.

The dominant angles, therefore, must have had some other origin than the simple linear proportions of 'two horizontal and one vertical;' and, that the Pyramid builders did look on angle as angle purely, we may refer to the azimuth trenches (vol. iii. Division I. p. 30, and Plate xv.), where the absence of perpendiculars and the elimination of the inner ends of all the radiating lines, appear to form proof positive that they were laid out as angles; and can be connected still, by angular measure only.

As angles then, but on what system of angular mensuration? Men call them now $51^\circ 51' 14\cdot3''$,

and $26^{\circ} 18' 10''$,—but what numbers did the Pyramid builders give them? Having already condemned those, who made the Pyramid builders divide the circle into 360° , merely because the Alexandrine Greeks used that method two thousand years afterwards,—we must seek something more to the point; and the following general principles, highly approved of elsewhere, immediately suggest that—

1st, The method of division should be agreeable to what is followed in other departments of Pyramid metrology; and

2d, The dominant angles of the Pyramid, when expressed in those terms, should be as nearly in *whole* numbers as possible.

For the first, then, we have the following parallelism afforded by the French circle graduation with their thermometer scale, but substituting the Pyramid thermometer numbers;—viz., 250° for the quadrant, 1000° for the circle, and decimal subdivisions of each degree.

And for the second, we have, on computation by that system, the two angles above mentioned, expressed in *even degrees* to less than one-tenth of such a degree; or, within those limits of probable error, already assigned to good Pyramid practical work. This *Pyramid* system of angle-mensuration, too, seems to be the only one yet tried in the world, which *will* give those two angles with tolerable evenness; as illustrated by the following numbers:—

System of Angle Mensuration.	Angle at Foot of Great Pyramid.	Angle of Passages in Great Pyramid.
360° to circle,	51° 51' 14.3"	26° 18' 10"
Same, with degrees divided decimally,	51.85°	26.30°
400° to circle,	57.62	29.23
100 to circle,	14.40	7.31
32 to circle,	4.61	2.34
1000 to circle, or the Pyramid method,	144.05	73.08

Structural reference to 250° in the Quadrant.

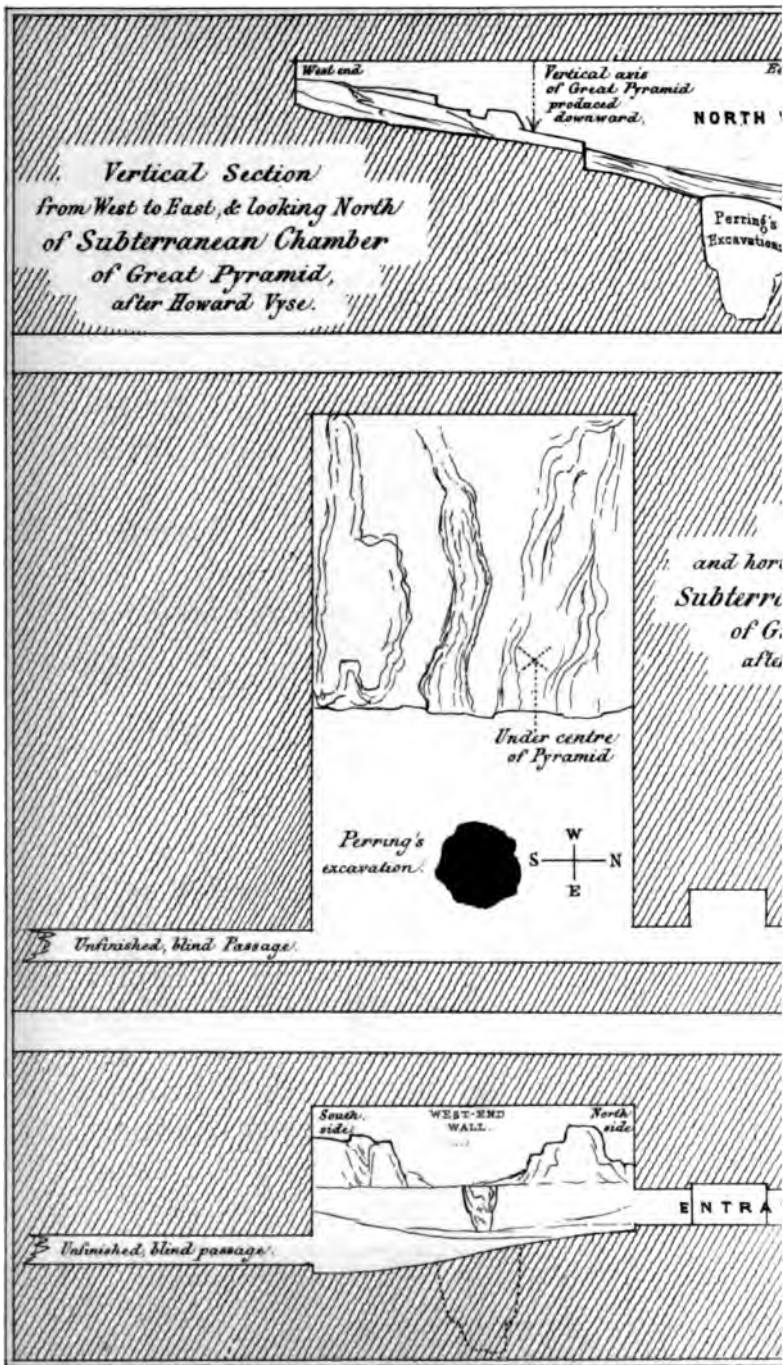
But there is some further testimony in the Great Pyramid, and actually marked into the building, as to the adoption of 250° for a quadrant.

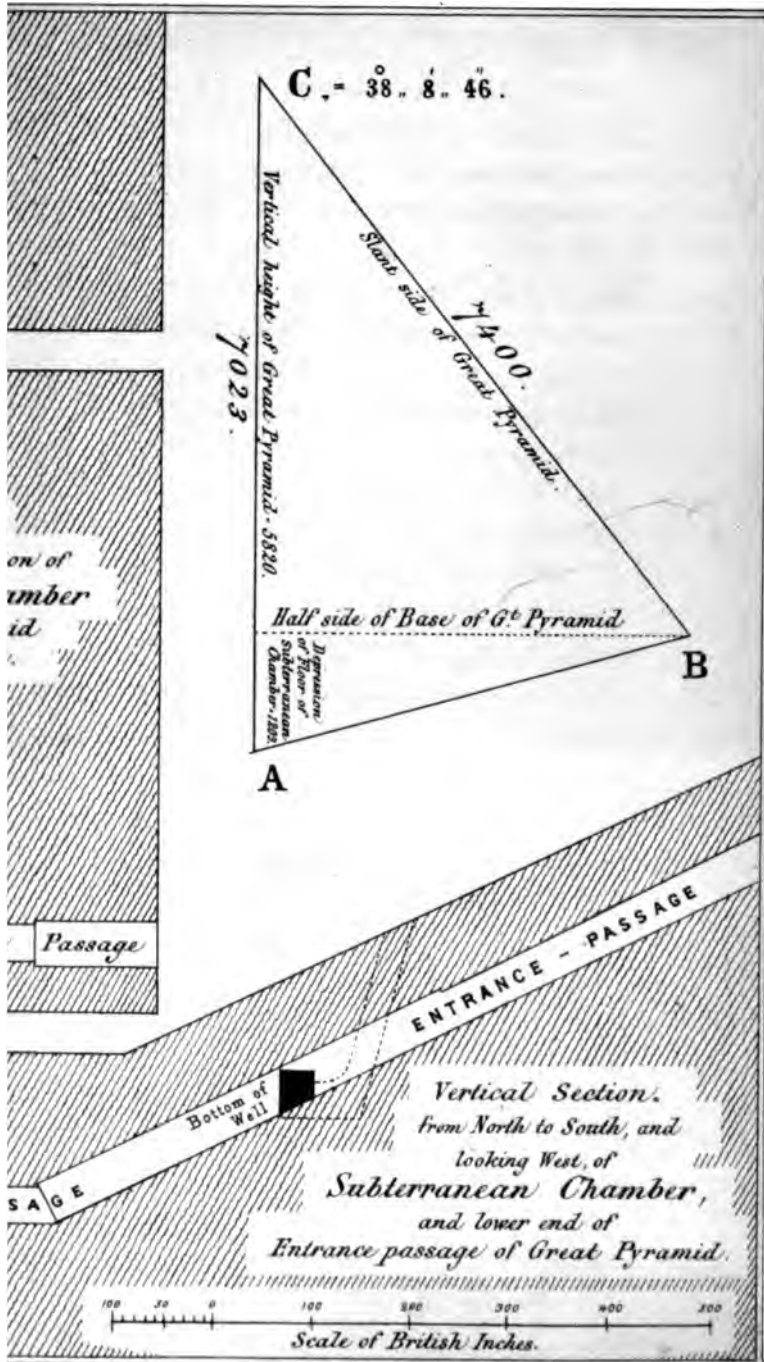
We have already shown, that despite the irregularity of the thicknesses of successive courses of the general masonry in the whole structure,—yet the final number of 50 was found to extend from the pavement, upwards to the floor of the King's chamber; or the chamber where the employment of a standard of 50 inches in length, was a distinguishing feature: and equally, a final number of twenty-five courses will be found to extend from the pavement to the floor of the Queen's chamber, where the employment of a standard of 25 inches in length, was a similarly important characteristic of its symbolization. But no reason has yet been found for the number of courses in the *whole Pyramid*, and no scientific use for the third, or *subterranean* chamber of the Pyramid. Yet, if the King's may be called *the chamber of the standard of 50*; and the Queen's,

the chamber of the standard of 25,—there seems reason to term the subterranean, the chamber of angular measure.

The chief actual, visible, and generally acknowledged *angularly* placed line in the whole Pyramid, is the entrance passage ; and the chief virtual line which must necessarily be referred to, as the zero for that species of measure, is the central vertical axis of the whole building,—and this axis, if produced downwards, will meet the entrance passage close to, if not actually within, the subterranean chamber. The entrance passage is indeed actually in a different vertical and meridian plane from the central axis, and would therefore pass by it altogether, without contact,—but for the former's expansion, at its lower end, into the subterranean chamber ; on the floor of which Colonel Howard Vyse and Mr. Perring have accordingly marked the place of the central vertical axis of the Pyramid produced. (See Plate iv.) The question, therefore, now is,—standing at that point of the floor of the subterranean chamber,—what is the angular subtense therefrom, of the whole side of the Pyramid, in degrees of the Pyramid, or 250° to the quadrant ?

This question is fortunately very simple to compute ; for in the triangle ABC (Plate iv.), CB , the length of the slant side of the Pyramid, or 7400 British inches, is computed from the elements of the vertical height, angle at summit, and base-side length already given, in Division 1.





C A, or 7023 British inches, is the sum of the vertical height 5820 inches, and the depression of the floor of the subterranean chamber below the Pyramid pavement, or 1203 inches, as determined on page 74.

And the angle at c, = $38^{\circ} 8' 46''$, or half the angle at the summit of the Pyramid, likewise already given in Division I.

With these elements, then, the angle at A, or the intersection-point on the floor of the subterranean chamber, may be computed, and found = $75^{\circ} 15' 1''$ of ordinary, *i.e.*, Greek-Alexandrine degrees;—and these, reduced to Pyramid degrees, are = $209^{\circ} 03'$.

If we now therefore turn to page 62, for the number of masonry courses in the whole Pyramid, they will be found to be stated, subject to a small residual uncertainty, as 210 ± 2 or 3: including, in fact, the very number computed; and forming as good a numerical proof of the quadrant having been *intended* to be divided into 250 degrees, as had been before deduced for the cubit being divided into 25 smaller portions, which we call inches.

Itinerary Measures.

Rather an antiquated, and now practically exploded form of linear measures would it be, to have one standard on which to measure the length of a day's journey, and another to ascertain the length and breadth of a field. But we use the term here, to designate a particular class of linear measures

which are bound up with angle, and rendered compulsory on all those who journey by sea; viz., 'nautical miles,' as distinguished from 'statute miles.'

The latter, of course, every one knows as arising from the mere multiplication—according to Act of Parliament—of smaller measures of length; and consisting, at the present moment, in Great Britain, by name either of 1760 yards, or 5280 feet, or 63,360 inches. But the former, or nautical miles, are nearly confined to navigators and geographers; and depend on the system in vogue of angle-mensuration, combined with the size and figure of the earth. Omitting at present the small variations due to the spheroidal figure of the world, the nautical mile is the length of 1' of arc (or the 1-60th of a degree, of which degrees 360 go to the circumference of a circle), on the surface of the earth near the sea-level; and is valued by most authorities as near 72,984 inches.¹

Hence we see at once that the approximation—between the lengths of a nautical, and a statute, mile—is something very distant; and though tolerated hitherto, is productive of continual confusion in many practical operations,—as in stating the speed of ships; the registration of revolving anemometers;

¹ At the Pole, the value is 73,037; and at the Equator, 72,783.

² As the lower latitudes are more frequented by shipping than the higher, 40° has been assumed as the average latitude. Also as the curvature of the earth is different on the prime vertical and on the meridian, the circle of curvature, crossing the meridian at 45° of azimuth, has been employed.—Raper's *Navigation*.

and many other subjects, where a difference of so much as 1-7th of the unit can by no means be permitted.

Now let us see how this matter would be regulated in the Pyramid metrology.

1st, The Pyramid mile is in length (see p. 142), equal to 62,500 Pyramid inches.

2d, The Pyramid knot being considered the 1-25th of a Pyramid degree, of which 250 go to the quadrant, will be almost exactly,—and on a mean between the Pole and Equator,—equal to 62,995 of the same inches.

Hence the difference between a nautical mile and a statute mile would, on the Pyramid system, be reduced from the present large amount in British navigation, of 1-7th, to so low a fraction as 1-125th,—a quantity that might be neglected in most practical operations, to the saving of much valuable time.

Compass Points.

Amongst other features of diversity which prevail presently between those 'who go down to the sea in 'ships,' and those who remain on dry land, is this often most inconvenient one,—that the former employ 360° to the circle in all their astronomical and more exact proceedings, but 32° , or 'points,' to the circle when alluding to azimuthal direction; whereas the latter employ 360° for everything angular. And yet, that there is no absolute necessity for so striking an anomaly, occasional seamen of

education sufficiently testify from time to time, by taking the direction, where great accuracy is required, of either a ship's course or the wind, in terms of degrees of which 360 go to the circle. This they do, when they once make up their minds to it, with facility; and are then able to reap advantage immediately,—in the resulting computations which may be required,—from all the numerous trigonometrical tables which are prepared and published for degrees of the 360° order.

But the general sailor, having observed the same natural things in terms of compass points, has either to reduce his points, half-points, and quarter-points to degrees proper,—an awkward proceeding, on account of the incommensurability of $11^\circ 15'$ or one point, $5^\circ 37' 30''$ or a half point, $2^\circ 48' 45''$ or a quarter of a point, and $1^\circ 24' 22\cdot5''$ or 1-8th point, to 360° ,—or he must refer to a special set of tables prepared for entry by points, half-points, quarter-points, etc., which tables are comparatively rarely to be met with, and are understood to be adapted only to the rudest and clumsiest of work.

Seeing how stoutly the sailors have stood out for ages against the recognised land method of dividing a circle, there is no prospect of controlling them to uniformity by Act of Parliament; and the only chance of producing that desirable bond of union amongst men, would seem to be, by offering them something eminently recommendable in itself for their own purposes.

Now the conveniences which seamen find in their method of points of 32 to the circle are chiefly, the fewer numbers they have to deal with then, as compared against degrees having 360 to the circle. But the inconveniences are,—the difficulty of treating arithmetically the barbarous fractions which arise, when directions have to be defined with greater accuracy than a whole point; without saying anything further on the bad commensurability of all of them, with angles reckoned in the usual manner.

Hence, if there is to be a practical method of compass directions on the Pyramid system—it must be, not by degrees, but by ‘points’ containing many degrees; attending, however, rigidly to this, that the Pyramid metrology can never admit of such an anomaly as *eight* points to the *quadrant*. But there may be ten; and then each point will contain 25° , a most proper content for any standard of the Pyramid.

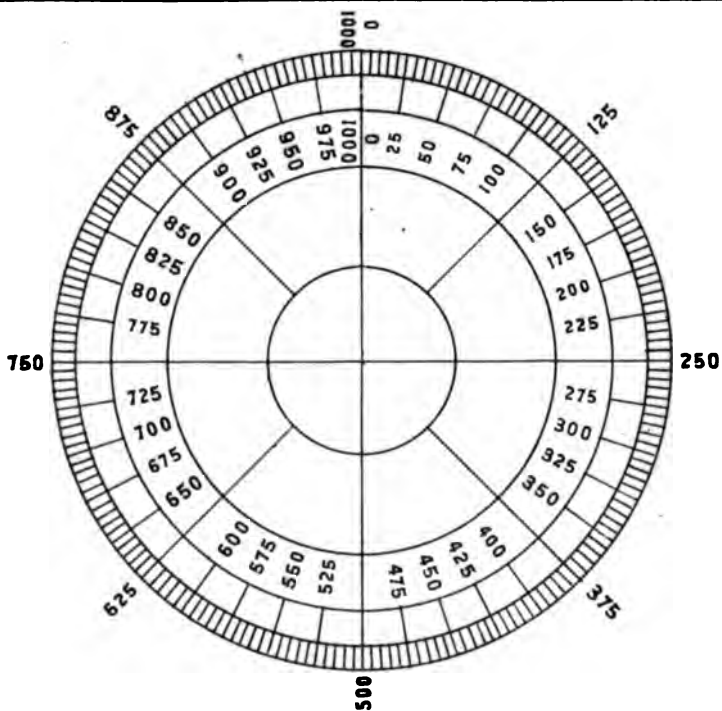
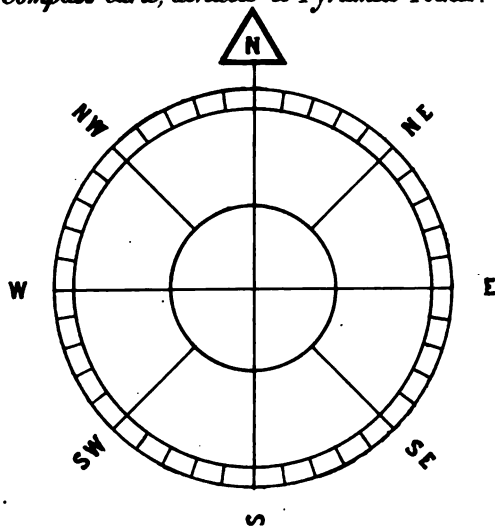
On this principle, too, the eight chief cardinal points, so-called, are retained, as N., N.E., E., S.E., S., S.W., W., and N.W.; and the only variation is, whether between these named points there shall be four divisions, as at present, or five. Four may be the easiest in some senses; but five presents no difficulty, at the same time that it is more expressive and exact. A greater number than five could not be admitted, because there would be an uncertainty in distinguishing at once by the eye which was which. Set out, for instance, ten even divisions, and few persons will be able to say instantly, on ocular inspection

only, which was the fourth, or fifth, or sixth ; but set out *five* similar divisions, and any one can say at a glance which is the second, or third ; or first, or fourth.

This is a peculiarity connected with the number 5, which we are told has been practically turned to account by the musicians of all modern nations in their choice of the number of lines wherein, or whereon, to write the notes of music ; four would be too few for their purpose, and six too many to distinguish by the eye in a moment ; but five serves either purpose. The same feature of advantage is further found when subdivisions have to be made with the eye ; so that if we have a scale divided mechanically to tenths of inches, and require to read off to hundredths,—*i.e.*, to subdivide each tenth into ten parts again,—a mistake of one of those tenths may often be made by inexperienced persons measuring in haste ; but if the same scale be divided mechanically into half-tenths, so that the estimator has only optically to divide each space into five parts, there is hardly any possibility of erring then, to the extent of any *one* of those parts.

Hence we may see, that there is really something noteworthy in the Pyramid system, and increasing its adaptability to all kinds of metrology, even in this one feature of making so much as it does of the number 5, as well as the number 10 ; and we trust that sailors will take kindly to the fact. At all events, in this manner they may have, if they



Compass-card, divided to Pyramid Points.*Pyramid Circle for Angular measure;
divided to every 5°, & numbered to every 25° of 1000° to the Circle.*

choose, between the eight cardinal points, five smaller points, each equal to a whole number of Pyramid degrees taken in groups of 25. And should they desire, as doubtless the best among them will, to steer closer still than to a single point, —if they will divide each of these Pyramid points into five parts, these will still be equal to a whole number of Pyramid degrees, or 5 degrees each; and will express very nearly as small a quantity in nature, as the troublesome half of a quarter of a point on their present system. While a further division still by five, will bring them to Pyramid degrees; and enable seamen then to speak in full and sympathizing community of terms, with all who make use of angular mensuration in its highest and strictest form.

See Plate v., for these things graphically represented.

SECTION V.

STANDARDS OF TIME.

IN Romé de l'Isle's metrological tables, the department of *time-measures* occupies a considerable space,—illustrating thereby the widespread belief, that time is one of the subjects to be treated of in any complete metrology. Later still, in the same country, not only did the arrangements for the new French metrical system confirm the same fact, but

involuntarily indicated the further truth,—that there are some features about *time*, which refuse to be bound by any rules invented, or to be invented, by man.

Thus, decimal division and multiplication were to have been the rule of everything throughout the metrical system ; and therefore its authors, on coming to ‘time,’ began upon the week as hitherto kept in the world,—and changed its contents from seven, to ten, days. The difficulty indeed there, was spiritual rather than physical, yet cogent nevertheless ; and will be, so long as the greater part of civilized nations believe, that the period of seven days was appointed by Almighty God as a rule to be perpetually observed by man. The grounds for believing this, we may examine afterwards ; at present we have only to deal with the fact, that the French metrical system practically ignored the belief, in their decades of days ; and then proceeded, or symmetrically should have done so, to their next steps in time-mensuration, viz., the periods of 100 days and 1000 days.

But then it was, that they were met, and decidedly overthrown, by nature ; which has caused the year of the earth’s revolution round the sun, to be so extraordinarily marked by changes and seasons,—the study of, and compliance with, which are absolutely necessary to man’s existence on earth,—that the period during which these seasons accomplish their cycle, is of infinitely more vital

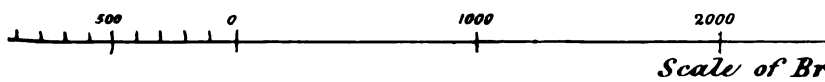
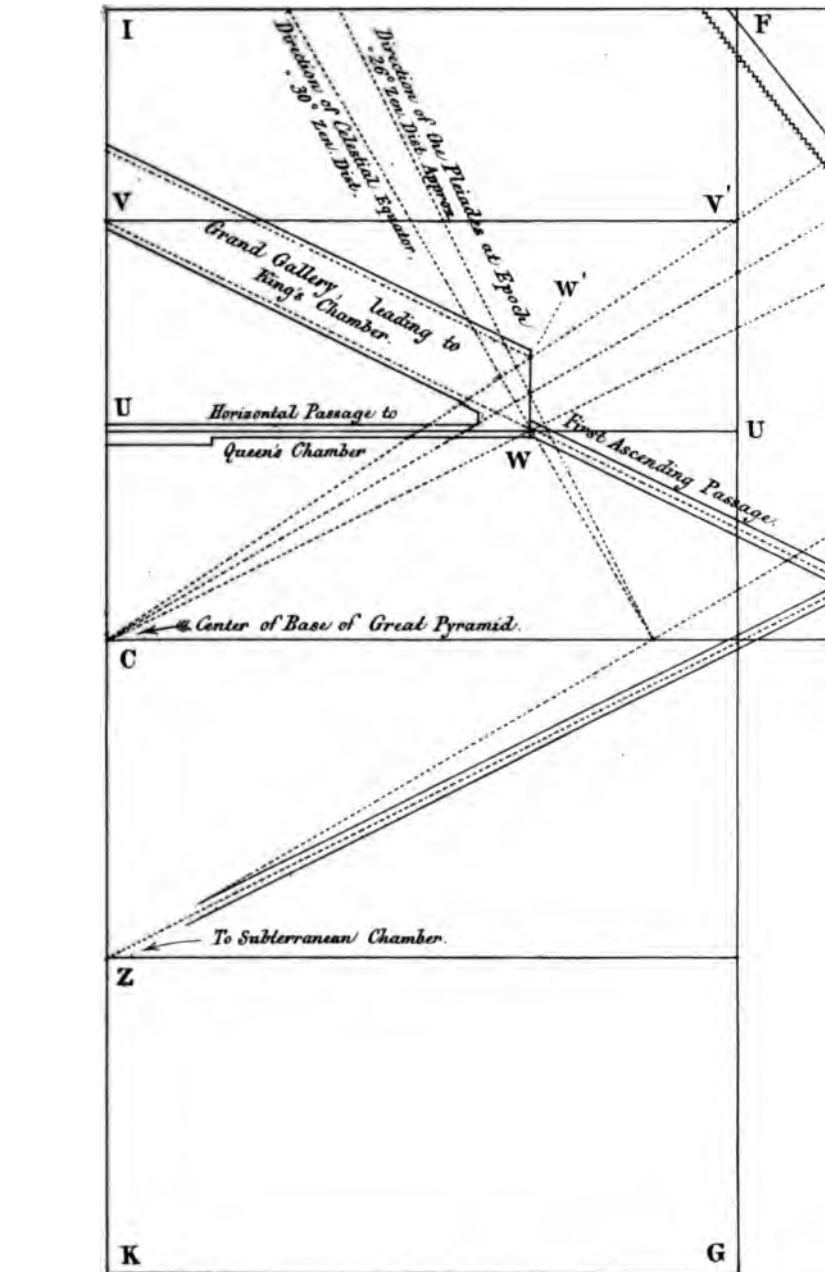
importance to humankind, than all the niceties of decimal arithmetic. The year is in truth one of the units of nature, as is the day; each and both of which must be observed by man, if he would live; and the day, whether taken singly, or in tens (the decadal weeks of the French metrical system), cannot be made by any decimal arrangement to give evenly the actual length of the year, which all our readers well know consists of 365 days, and very nearly a quarter of a day.

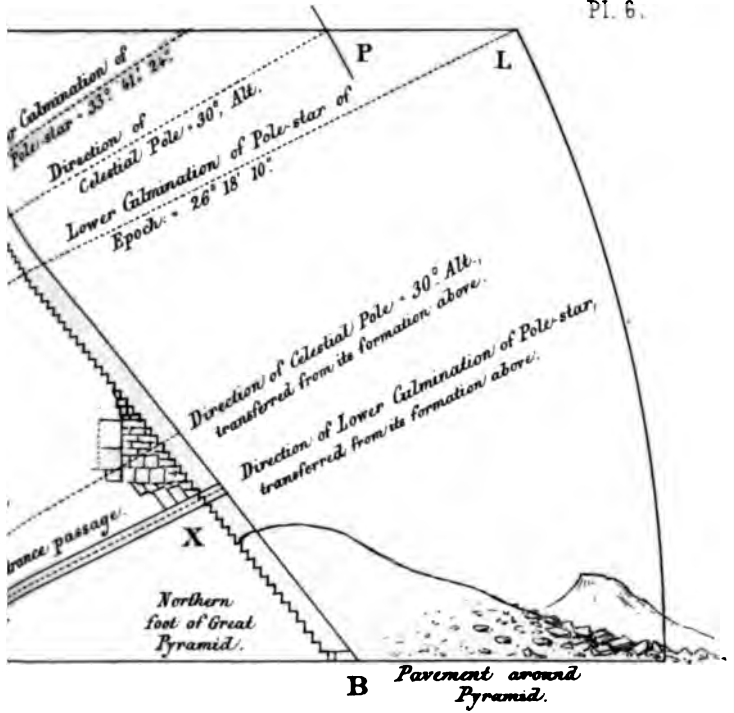
The year, then, in spite of attempts at alteration, is still the same in France as it used anciently to be, before the metrical system was ever thought about; and so is the week too; for the metrical reformers found it in the end, as practically impossible to impose a decimal arrangement there, against the moral and religious prepossessions of mankind in favour of seven, as to fight against the physical arrangement of 365·242 days in the solar tropical year. As so signal a failure, then, of their attempts has been the result, pity 'tis they ever tried the proposed alteration; but they were driven on probably by the popular enthusiasm of the moment for decimalizing everything,—without waiting to consider whether everything can, or ought to be, decimalized. Now this piece of common information, so useful for the framers, as well as the subsequent employers of metrological arrangements, but which the Parisians were void of in the last century,—was furnished ages before in a most conspicuous manner at the

Great Pyramid : for the first feature held up by the general form of the whole building, is, the incommensurable relation evenly,—as we have already had occasion to mention,—of the radius to the circumference of a circle (see vol. iii. p. 20) ; a proportion indeed which no man through all time coming, will ever be able to divide evenly, upon either a decimal, or duodecimal, arithmetical system.

Again the incommensurability evenly of the day and the year is exhibited practically in the same ancient structure, by the expression of the number of whole days and the portion of a day, constituting a year, in terms of the sacred cubit, in the length of one side of the base of the Great Pyramid ; which combination too, of time distinctions with linear standards, seems to furnish further proof positive, that *time-mensuration* was to be treated of in the Great Pyramid, as well as other more usual topics of ‘ weights and measures.’

A still further warning seems to have been given to the effect,—that the seven days composing a week, formed an essential interior institution ; though how this was to be represented with clearness and certainty in a Pyramid where the arrangements, proportions, and parts generally go by fives, may not appear immediately on the surface ; and in fact, presented itself to me only recently, when considering the measures contained in Volume ii.





Enlargement of the lower right-hand portion of diagram 3 of Plate 2, Vol. III, preserving the same letters of reference, and showing the coincidence of symbolical astronomical lines, dotted, with the lines of construction of the passages, of the Great Pyramid, taken from Plate 3, Vol. I.

The Week in the Grand Gallery.

Of all the internal architecture of the Great Pyramid, the Grand Gallery is the most unique, anomalous, colossal, and hitherto entirely unexplained. Why, for instance, was it made so enormously high, when the passages both before and behind it are so distressingly small; these so low that no man can move through them without stooping painfully, the other so high that a visitor's torch can hardly show him the roof; and all this in a building where our careful inspection of the joints, sizes, qualities, and fittings of the stones convinced us, that everything had been well considered, and thoroughly calculated beforehand, with a view to the maximum of economy, combined with efficiency, for some worthy purposes intended.

A further development on Plate VI., of the geometrical theory of the Pyramid (illustrated in small upon Plate II.), showing that the direction of the celestial equator enters the north end of the Grand Gallery, from an astronomical intersection on the base of the Pyramid,—had led me, in 1864,¹ to look on the Grand Gallery as connected with *time*; and then, the seven architectural overlappings which every one has remarked in the side walls, suggested a possible connexion with the week of seven days; this idea being further strengthened,—on believing that the vertical height of the Grand Gallery, an expression for which was also obtained from the

¹ See *Our Inheritance in the Great Pyramid*. Part IV.

same geometrical and astronomical diagram,—must be seven times that of one of the ordinary small passages, which might be considered to represent unit days.

To such an idea, then, what answer is returned from our measures last year?

First, That the vertical heights of the small passages are by no means uniform ; that of the inclined passage entering the Grand Gallery from the north, being 53·0 British inches ; and that of the horizontal passage leaving it at the opposite, or south, end, being only 43·7 British inches. Such an amount of difference would be fatal to the two lengths meaning the same thing in linear measure ; but then it is not linear measure for its own sake, which is now being sought ; for that having been settled and proved with all exactness in the base of the Pyramid, does not need being proved anew ; and, indeed, there are indications in other places besides this,—as in the mutual incommensurability of the lines employed for the shape of the coffer,—that men were purposely by such differences deterred from seeking linear standards inside the Pyramid, or anywhere else than the one true place for them, viz., the sides of the base of the entire Pyramid.

But in our late discussions about the coffer, we neglected its figure, as an ultimate object,—because, mere figure is of no essential importance for the purpose of capacity measure ; and we considered only the cubical contents. In the Grand Gallery,

therefore, we must on the same principle similarly neglect the differences between the passages of entrance and exit from its either end, and consider only their mean value, which is 48·4 inches; and then ascertain how many times that goes into the height of the giant hall.

The height and length of this important feature of the Pyramid's interior, have been thus variously given by diverse authorities :—

Authority.	Date.	Height, supposed always to be vertical, of Grand Gallery, from inclined floor to roof.	Length, supposed to be always along the incline, of Grand Gallery, from north wall to south wall.
	A. D.	British inches.	British inches.
Greaves,	1639	312	1848
De Monconys, . . .	1647	...	1947
Thevenot,	1655	...	1944
Maillet,	1692	300	1488
Egmont,	1709	270	1632
Shaw,	1721	270	1632
Dr. Perry,	1743	288	1800
Fourmont,	1755	...	1848
De Binos,	1777	288	1632
Coutelle,	1800	320	1595
Jomard,	1800	323	1461
Richardson,	1817	312	1440
M. Caviglia,	1817	360	1824
William Turner, ¹ . . .	1820	'about' 600	'about' 4200
Howard Vyse,	1839	336	1872
E. W. Lane,	1840?	...	1896
C. Piazza Smyth, . . .	1865	339·5	1883

Out of these various heights, it is to be hoped I may be excused for preferring my own, seeing that the practical measure is a very difficult one to make at the place, without some special apparatus being

¹ *Journal of a Tour in the Levant.* London, John Murray, 1820.

provided ; and which apparatus is not mentioned as having been possessed by any of the former observers. My own result, too, being the mean of a large number of measures (see vol. ii. p. 86) taken at various parts of the length of the Gallery, can claim to represent the mean height of the whole Gallery ; and, with its assistance, we find 48·4 going into 339·5, 7·014 times ; or certainly sufficiently close to seven times even, to enable any one to distinguish that it is 7, rather than 6, 8, 9, or 10, which is intended.

The Sabbatical Week in the Queen's Chamber.

A division by 7, suddenly occurring in a Pyramid generally devoted to tens and fives, requires emphasis to assure one, after thousands of years have passed away, that it was no mistake or accident of the builders, but an intended purpose of their system. Accordingly, we have already seen the local division of 7 repeated twice in the Grand Gallery, and shall find it yet twice again before leaving the neighbourhood.

From the lower northern entrance point of the Grand Gallery, there radiates off, pursuing a nearly horizontal direction thenceforward to the south, a passage, known as the horizontal passage, leading to the Queen's chamber. Source of unnumbered perplexities has been this passage to Pyramid measurers ; for some begin to measure its length at once from the north wall of the Grand Gallery ; some

from the beginning of its own horizontal floor, twenty-two inches south of that; and others again from the point of its passing under the floor of the Grand Gallery, nearly 200 inches from the first starting-point. This latter idea, however, seems just as unsupported by the whole facts concerned, as that of other men beginning to measure the length of the Grand Gallery from the same point,—merely because it is a signal beginning, yet not the first, of its inclined floor-plane.

Now the manner in which the Grand Gallery floor *seems* to terminate at some distance from its northern end, is undoubtedly very striking in an architectural point of view (see Plate VI. vol. i., and Plate X. vol. ii.); and as it connects itself with the roof of the horizontal passage passing under it,—deserves some attention in this inquiry; especially on considering, that that roof is the only fully finished part of the horizontal passage, whose floor is indeed so entirely unfinished as to be no floor at all, in a Pyramid sense of masonry. While further symptoms obtrude themselves on the eye, to the effect—that all this northern end of the horizontal passage was once intended to be built up and concealed, beneath an apparent continuous inclined floor of the Grand Gallery; which would then have extended from its northern wall the whole way up to the grand step in front of the southern wall. Nevertheless, attending for the time, only to the forms and finish actually before us,—breakages ex-

cluded,—the distance from the north wall to the mean of the two cuts-off, by whose united effects the great triangle, viewed in section of the Grand Gallery floor, is terminated northward, has been found equal to 217·8 inches (vol. ii. p. 58.)

Taking this, then, as a pointed or pricked-off part of the length of the horizontal passage,—how many times does it go into the entire length? That quantity being by our measurements 1519·4 inches, the answer is 6·98; or practically 7 times, and certainly not 6 or 8, or any other simple number.

This, however, is not all which the passage has to indicate; for at its farther or southern end is a portion having a suddenly increased depth or height,—after a proportion of 68 to 46 nearly,—and in length equal to 216·1 inches. A simple matter, yet stumbled at grievously by modern authors; for the great French work in its fine engravings ignores this deep step altogether; and Chevalier Bunsen, in his Plate XI. vol. ii. of *Egypt's Place in Universal History*, turns it, the step, the wrong way, or makes that part of the passage of *decreased* height. But Colonel Howard Vyse's measures agree entirely with ours, and enable the statement to be put forth confidently,—that the southernmost part of this passage is the largest and noblest in its proportions of height; while in length, it is practically again 1·7th of the whole passage, or, more accurately, 1·7·03.

Now here is the first possible indication of a very different thing from a mere division by 7; for many

early nations are said to have counted by sevens, and by weeks of seven days, too ; the practice being attributed to them by modern *savants*, on account of the facility of the days of the year being almost entirely disposed of without large remainder for intercalation, by fifty-two weeks of seven days each ; and similarly the days of the month, by four weeks of the same length. But the Egyptians of the Pyramid and earlier days did not even make this use of 7, preferring to divide their lunar month of 29.53 days, into three portions of ten days each, or to use a decadal week ; and the year into three seasons, the inundation, the growing, and the harvest ; much less, then, did the Egyptians attend to, or respect, a period of seven days ending with a sabbath, *i.e.*, one day of a more important character following six ordinary ones. In fact, such approved books of reference as Kitto's *Cyclopædia of Biblical Literature* and Smith's *Dictionary of the Bible*, together with all their authors quoted from, profess entire ignorance of either the Egyptians or any other early heathen nation having been acquainted with the week as we now understand it from the Hebrews,—viz., again, seven days ending with a sabbath day ; though communities in different parts of the world had simple weeks of a variety of days—five, seven, nine, and ten.

Agreeing, then, with these authors in the mere fact that a week of seven days ending with a sabbath is a far more rare, peculiar, and advanced institution than one of seven days merely,—but

acknowledging the Pyramid principles which we have submitted to elsewhere ; or that nothing important can be considered intended to be proved, unless in the finest and truest of workmanship,—we must leave this entrance passage, though it does bear some constructive resemblance to the definition of the Hebrew week, and enter the chamber it leads to, viz., the Queen's chamber, so called.

Why so called, it is difficult to say with any good reason conformable to tradition or discovery ; for if kings were reported to be buried inside great Pyramids, queens were said to be buried in small Pyramids outside ; and here, in this chamber, not the smallest line or scratch of a hieroglyphic, such as tombs proper to Egypt abound in, or any remnant of the ordinary sepulchral preparations, has been found in modern and provable times. One of the early Arabian historians, indeed, Aboo Djafar Mohammed Edrisi, who flourished about seven hundred years ago (see Howard Vyse's *Pyramids*, vol. ii. p. 335), speaks of this chamber as 'a square room, wherein ' was an empty vessel, and on the roof of the room ' are writings in the most ancient characters of the ' heathen priests.' He afterwards visits the King's chamber, and describes that as 'a square room also ; ' and with an empty vessel similar to the former.'

All this description, is evidently inapplicable to the Queen's and King's chambers as we know them now ; but how much we may retain as true, is not easy to say, on the historian's own merits.

Mr. Perring, again, whose ideas as an engineer and architect, and while still working under Colonel Howard Vyse, were sound—considered that this chamber was merely a hollow space for storing, during the building of the Pyramid, the huge blocks of stone with which the first ascending passage was afterwards completely filled up, solid, from the inside; the men escaping by the well, in the manner he has indicated. And Mr. Perring having had the blasting and clearing out of some of these strange fillings of the passages in other Pyramids,—where he was the first man, since the original builders, to make an entry,—we bow so far to his authority; at once confessing the probability, both that the first ascending passage of entrance in the Great Pyramid was so rammed; and that the blocks wherewith it was rammed full—when everything else in the structure was complete,—*may* have been kept waiting the occasion in the Queen's chamber.

The Queen's chamber, then, in actual fact and utilitarian reality, served, or may have served once, as a store-room for stone blocks; but was that *all* the purpose the builders had in view when constructing it? Few parts of the Pyramid have fulfilled one purpose alone; and not only have we seen already, in the azimuth trenches, that both mortar-mixing during the building, and mummy-burying afterwards, had followed the institution of a peculiar angular arrangement,—explainable only on the hypothesis of its having served an important

feature in the theory of the building. But the most casual observer who looks to anything at all, in this Queen's chamber room (and many hasten away quickly on account of the close smell and un-ventilated air), must be enraptured with the original whiteness of the stone, and microscopic fineness of the workmanship on the blocks lining or forming both walls and roof; for some parts of them, certainly several of the joints in the west wall, are the closest and most accurate in the whole Pyramid.

That being the recorded and positive case, then, every maxim of the building we have learned yet, points to something else of a nobler order having been once intended for the chamber, than mere storage of stones. Let us look at it therefore, *first*, in a merely mechanical point of view. The floor is nearly square, *i.e.*, 205 by 226 inches, or vastly nearer such a form than is any other room in the Pyramid; besides which, this chamber includes between these approximating lengths that special length we were just discussing, of the higher and nobler terminating seventh portion of its *own* entering passage, *viz.*, 216 inches.

We may *next* remark that the room is *seven-sided*; not walled, but sided like a crystal or a geometrical figure; for it has a floor, four walls, and two ceilings, on account of the covering above being angular, or in two halves, each inclined about 31° to the horizon. But what are the proportions of these seven sides as to area? for unless something similar

comes out in that way, we could not think of them as units of the same order. The following is what appears on merely taking the rude lengths, breadths, and heights as given by present measure (see vol. ii. p. 66) :—

			Square inches.
North wall,	.	.	226 × 183 = 41,358
South wall,	.	.	226 × 183 = 41,358
East wall,	.	.	205 × 214 = 43,870
West wall,	.	.	205 × 214 = 43,870
North roof,	.	.	226 × 119 = 26,894
South roof,	.	.	226 × 119 = 26,894
Floor,	.	.	205 × 226 = 46,330

No very distinct story of anything is told by these numbers ; and we are driven thereby to consider, whether the existing measures represent the ancient room ; for unless they do, of what service can they be in such an inquiry ? No sooner, too, do we look at it with this view, than the question comes up,—What method are we to pursue with the floor, or about the floor ? for flooring proper, as suitable to a Pyramid chamber, or even passage, this chamber is not in possession of.

Correction for Flooring.

As already mentioned in vol. ii. p. 62, the floor lining blocks of this room, if ever put in, are now decidedly taken out and gone ; wherefore we must replace them by computation, if we would hope to come at the original proportions of the chamber. But of what thickness shall these imagined floor blocks be ? The evident answer is,—‘ See if there

'are any markings on the walls showing how high the 'flooring once stood.' On examining the lower part of the walls accordingly, nothing was found ; and we had to follow the walls upwards from their very bottom, to the level of the first overlappings of the niche in the eastern wall, and to the top of the northern doorway,—before any horizontal cuttings were met with.

But these three necessary cuts and shapings are all on one level ; and therefore, though a floor line at their height presents the incongruousness of sealing up the entrance to the chamber,—yet seeing that it is a symbolic chamber, and *was to have been sealed up again*, and at that same precise height, by the completion of the Grand Gallery floor at the north end of its entering passage,—this virtual closing up of the entrance may be allowed as a trial hypothesis in our present research ; and a symbolical flooring may be imagined at the marked height alluded to, or sixty-seven inches above the actual rude foundation blocks. Subtracting, then, this quantity from the height of each of the walls, we have the corrected area of the sides of the room, as

			Square inches.
North wall,	. . .	226 × 116	= 26,216
South wall,	. . .	226 × 116	= 26,216
East wall, .	. . .	205 × 147	= 30,135
West wall,	. . .	205 × 147	= 30,135
North roof,	. . .	226 × 119	= 26,894
South roof,	. . .	226 × 119	= 26,894
Floor,	. . .	205 × 226	= 46,330

Something more is beginning now to appear, but

not very clearly as yet ; wherefore returning to an examination of the room, and wishing our measures had been more exact than they were, when they necessarily had the uneven floor stones as their base plane,—we are reminded of the presence of the colossal niche in the eastern wall. (See Plates VII. and VIII. vol. ii.) That niche, we had left out of the calculation at first, as being a subsidiary feature of the apartment, and rather difficult to deal with. What was it intended for, for instance ? There is nothing like it through all the rest of the Pyramid. ' I excavated in vain below it, in quest of a sepulchral pit,' wrote Sir Gardner Wilkinson years ago ; and years further off still, other men had burrowed a distance of 50 feet eastward into the masonry at the back of the niche, searching for treasure, or a pathway to the Sphinx, and found neither.

Our only safeguard here, from numerous unfortunate errors, would seem to be—mechanical appreciation of facts and forms ; in which sense, the niche is evidently an addition to the bulk of the cubical contents of the room ; and the easiest way to allow for it would be,—to suppose the east wall of the chamber, simply as a plane, pushed outwards to such a distance farther eastward, as to produce thereby the same increase of cubical space as that given by the niche. Now the niche recedes over its chief extent, about 41 inches ; but is nearer 140 inches in some of its middle and lower parts ; though how much exactly, we cannot say, on account of

modern dilapidation. Let us try, however, 25 inches, in the calculation of the wall; and then we have,—

			Square inches.
North wall,	. . .	251 × 116 =	29,116
South wall,	. . .	251 × 116 =	29,116
East wall,	. . .	205 × 147 =	30,135
West wall,	. . .	205 × 147 =	30,135
North roof,	. . .	251 × 119 =	29,869
South roof,	. . .	251 × 119 =	29,869
Floor,	. . .	205 × 251 =	51,455

or, expressed in terms of ten thousand inches, six of the sides of this fair and white-walled chamber represent three each, and the seventh represents five; the latter an important number in its place as a Pyramid number, as well as of more actual weight than the others. So that we seem to have now the original secret of this room before us, in the same elemental manner as we had that of the azimuth trenches, on measuring their axial angles; and find it to be no other than the culmination of the various symbols of a week, which we have been touching on indistinctly elsewhere, but now have come to positively, and are absolutely shut up with, finding it to be a week like the Hebrew week, consisting of six ordinary days, terminated by, or founded on, one larger, nobler, and, in the Pyramidal terms in which they are measured, more glorious than the rest.

Authority for Twenty-five Inches.

But all the approximate accuracy of this result, as 3, 3, 3, 3, 3, 3, and 5, in terms of even numbers

of 10,000 square inches,—depends on having employed a length of 15 inches on the surface of the whole east wall, to represent the cubical contents given by the greater depth, but smaller surface, of the eastern niche; and though *some* correction of the sort was evidently required by the presence of the niche, there has been no structural indication as yet recognised in the room, distinctly counselling that one, rather than any other, number of inches to be used.

Under these circumstances of mental dissatisfaction, the idea spontaneously arose, and only recently, in my mind,—to test by measure this chamber's second and next most striking anomaly to the existence of the niche itself; and one equally unexplained by all hierologists and Egyptologists who have ever written on the Great Pyramid. This second anomaly is, that so grand and admirably wrought an architectural feature as the niche, should *not* have been placed in the middle of its containing wall! (See Plates VII. and VIII. vol. ii.)

The wall being *pointed* towards the top, shows clearly enough where its central vertical axis lies; and then one sees, as a most painfully evident want of ordinary architectural symmetry, that the niche is on one side, or to the south of such a line. Not so far as to belong altogether to the southern half of the chamber, for a plumb-line from the central top of the wall would strike within the lower and broader part of the niche; but still, grossly far to the south

of the similar feature of the room. So far, that no modern—with eyes set square in his head—can fail to perceive it as a most notable fact; and so far also, that no ancient Pyramid builders could have committed a fault to so huge an extent; or have knowingly introduced such a feature, without careful calculation beforehand, of the sizes and shapes of the fine-qualified, well-worked stones required to give it a form and local habitation. How *far*, then, is the vertical axis of the niche horizontally from the vertical axis of its containing wall?

Here, I have to regret exceedingly, that no idea of the amazing importance of the Queen's chamber occurred to me, when there; and that I merely measured general features, standing on the rough, uneven floor-stones, and not knowing particularly what most required measure. But I fortunately took, pretty accurately, the breadth of the base of the niche, and the distance of its either side from the terminating lines north and south, of the east wall; and computing recently from these, the distance of the central axis of the niche, from the central vertical line of the east wall,—what was my surprise, to find it practically 25 inches; or, as the numbers came out, 25·3 inches; and again, to find that the breadth of the head of the niche was likewise 25, or 25·3 inches.¹

¹ The only test for these last numbers, rather inferred than very closely measured (as I could not, when standing, reach to the higher part of the niche), are,—so far as I know,—Mr. Perring's drawings in Colonel Howard Vyse's folio publication on the 'Pyramids of Jeezeh;'

'Why, here at last we have come upon the sacred
'cubit of the Israelites!' was the very natural exclamation to make; 'and how, or in what position,
'have we found it? In the act of serving as the
'signal under which has been commemorated the
'sabbatical week; that week which may have been
'a primeval Divine command to all men, in terms
'of the 2d chapter of Genesis; but which had been
'since so generally forgotten by them all, that we
'may now for the moment distinguish it by the proportions of its parts, but without reference to date,
'as the week of the Hebrews and Mount Sinai. We
'have this communication, too, in a chamber of the
'whitest stone of the Pyramid, and one wherein,
'both by its want of ventilation, and the preparation for filling up the entrance passage to its roof,
'man was evidently not intended to dwell much.
'Certainly, he was not to interfere there as a master,
'or presume to alter any of the symbols of days ex-

and they give, with some evident errors of drawing, for the breadth of the niche at the top, 23.5; for the distance of its central axis from central vertical line of room, = 26.0 inches; and for distance of same from plumb-line hanging from top of angle of wall (not quite the same as the half distance between the two side walls), = 24.0 inches. But it is a greater strain than any drawing on such a small scale ought to be exposed to.

With regard to the excess of 0.3-inch on my own measures, it is not more than error of observation with error of appreciating dilapidation-effects, under the circumstances, would render very probable. Chevalier Bunsen, too, has remarked, in vol. ii. p. 31 of his *Egypt*, and with reference to a determination of other cubits, 'A difference of three lines (old French measure) is certainly no reason for doubting the original identity of two measures which has been established by independent systems, and with different materials for making the calculation.'

‘pressed by its walls, and indicated by the standard
‘above them, as derived from a source higher than
‘man. The only source, too, which *could* in primeval
‘days, have furnished, for the sacred cubit, the un-
‘approachably perfect terrestrial reference which it
‘has ; viz., the one-ten-millionth of the earth’s semi-
‘axis of rotation.’

Authority for the Number Twenty-five.

But we must still delay all *quasi*-religious or psychical discussions, and attend merely to mechanical, or rather to masonic features, used in the architectural, not mystical, sense. And then, there is the further fact of construction to be found,—that the Queen’s chamber,—or, as it might more appropriately be termed, the chamber of seven, or again, the chamber of the standard of 25,—has another reference still to a standard of 25 inches ; a standard, indeed, as eminently and intimately connected with this chamber’s main symbolization, as the standard of 50 inches has already been shown to be with regard to the King’s chamber, and its scientific interpretation.

‘Standards of length, *equal* to 25 and 50 inches, but not necessarily expressed in inches,’ might any one unacquainted with the Great Pyramid correctly remark. To which, however, the Great Pyramid itself answers, ‘Nay ; but the actual number of the units, of the same length very nearly indeed, as inches, call them by what name you may, must be

‘ respectively 25 and 50 ; for the latter number was
 ‘ shown (p. 172), to enumerate correctly the courses
 ‘ of masonry reaching up to the floor of the King’s
 ‘ chamber, from the Pyramid’s base ; and now it will
 ‘ be proved, that the number of courses reaching
 ‘ from the same plane to the floor of the Queen’s
 ‘ chamber, is apparently 25.’

As no such connexion has been detected, or even imagined, hitherto by any known author, and the data are still very scanty,—we will try to lay them in all their scantiness and weakness before the reader, that he may not be misled by mere assertion.

First of all, then, for the height of the upper surface of the twenty-fifth course of masonry of the Great Pyramid above the pavement,—we have the following authorities from our vol. ii. sect. i. and v.:—

	British inches.
MM. Jomard and Cecile, in 1800 A.D., . . .	= 859
MM. Le Père and Coutelle, „ 1801 „ . . .	= 877
C. Piazza Smyth, „ 1865 „ . . .	= 869
Messrs. Aiton and Inglis, „ 1865 „ . . .	= 858
Mean height of twenty-fifth course, . . .	= <u>866</u>

Colonel Howard Vyse and Mr. Perring do not seem to have made these necessary measures of every building-course of stones in the Pyramid,¹ imagining probably, and with most persons, that there was nothing, in their dimensions, accurate or intended beforehand ; but they fortunately did their best to measure the next element which we require, or the height of the floor of Queen’s chamber above

¹ See Vyse’s *Pyramids of Gizeh*, vol. ii. p. 110.

the Pyramid's base. There, other authorities are more rare; neither is it easy to perceive how to proceed, with what those few have given us. For, to what part of the Queen's chamber ought we, in due architectural propriety, to make the hypsometric reference? Not to the present floor, which has been already shown to be a mere excavated hole, or unfinished pit; and not to the roof of the apartment, because that was not the portion of the King's chamber to which we referred, when investigating there for a similar commensurability with another masonry course. But we referred, then, to that room's *coffer-bearing* floor, which is very notably 42 inches below the ceiling of its entrance passage. And as the ceiling of the entrance passage to the Queen's chamber is likewise an accurately formed feature,—we take 42 inches below that, and then find the horizontal plane there, to be vertically above the Pyramid pavement, according to

	British inches.
Howard Vyse and Perring,	= 833
And Aiton and Inglis,	= 894
Mean,	<u>864</u>

or much closer to the height of the twenty-fifth course, than any one could have expected from the roughness of the measures employed; and showing too, without the smallest doubt, that that course is contained *within* the uncertainties of the floor as dependent on modern measure to prove either its present existence, or ancient structural intention.

Now, this is in itself a very noteworthy circumstance connected with the question of 'design ;' for whereas the Pyramid courses, on the whole, decrease in thickness as they ascend (from 58 to 26 inches, says Colonel Howard Vyse approximately), and the King's chamber floor is as much vertically above the Queen's chamber floor, as this is above the Pyramid base, according to the same authority,—evidently that coincidence of both the fiftieth and the twenty-fifth courses with these chambers respectively, could not have taken place if such decrease of course-thickness had been perfectly regular. For in that case, if 50 had reached the King's floor, less than 25 would have reached the Queen's, or if 25 had touched the Queen's, a greater number than 50 would have been required to attain the King's floor.

But here we may see the effect of that remarkable increase in the thicknesses of the courses, which takes place between the 25th and 50th, as well as the over-rapid rate of diminution from the foundation courses upwards until the above correction is interposed ; and which correction any good photograph of the Pyramid will show. Show it, too, not beginning or terminating with either of these courses, for that might have revealed the secret too easily ; but occurring sufficiently within their limits, to prevent more than 50 being required to step up to the chamber of the standard of 50 inches,—after 25 had successfully marked a similarly placed floor in the chamber of the standard of 25 inches.

Hence the proportions and arrangements of parts we have been enabled to describe in the Queen's chamber,—not only indicating a week like the week of the Hebrews, of six ordinary days and a sabbath day,—but connecting it with the sacred standard of length of the Hebrews, or 25 inches ; or again, the one-ten-millionth of the earth's semi-axis of rotation,—are also connected with the finest and best, largest and most pervading structural features of the whole Pyramid ; so that they could have been introduced at no other period than that of the very building of the entire monument, and by no other man than the original architect himself.

If, therefore, for the further elucidation of the general question of the sabbatical week,—of such infinite importance to mankind,—we should desire to find the *date* of its symbolization in this remarkable chamber of the Pyramid,—we are thrown back on the larger, and more general, question of, 'What is the date of the building of the Great Pyramid itself?' And here the authorities to be consulted are numerous.

DATE OF THE GREAT PYRAMID.

Without at this point going very particularly into minutiae or reasons, there is no difficulty in gathering that the general progress of literary inquiry during the last fifty years has been to increase the received antiquity of the Great Pyramid.¹ Thus, in and

¹ One exception, indeed, does exist in the *Historical Survey of the*

about A.D. 1817, the date of 1800 B.C. was frequently quoted for the building of that Pyramid ; but in Sir Gardner Wilkinson's *Ancient Egyptians*, published in A.D. 1837, the period is extended to between 2083 B.C. and 2123 B.C. ; and in the same author's subsequent Murray's *Handbook to Egypt*, in A.D. 1858, the date is raised to 2400 B.C.

This increase is, however, only a moderate portion of what had then grown with the times, and which our truly sage British Egyptologist resisted admitting to its full extent ; notwithstanding, too, that the researches of the most learned German philosophers, with the indescribable prestige in this country in favour of everything German, had been mainly instrumental in bringing about the new idea. Thus, the renowned Chevalier Bunsen,—the authorized English translation of whose great work on Egypt began in 1848 and ended in 1860,—gives for the date in question, and with the utmost confidence, the year 3280 B.C. ; while the equally learned, and

Astronomy of the Ancients, by the late Right Hon. Sir George Cornewall Lewis in 1862, and a most melancholy affair it is ; for, persisting in looking at all things in the world merely through ancient Greek classical authors, and employing himself in writing privately on astronomy, instead of perfecting the establishment and developing the powers of a Royal Astronomical Observatory placed officially under his charge, he concludes that there are no authentic accounts of anything earlier amongst men than the era of the Olympiads, or 772 B.C. (p. 433) ; and that 'it is difficult to fix any event resting on a certain tradition which 'can be carried up to so high a date.' But on page 440, he consents to name 1012 B.C. as the higher limit of all possible dates for building, either the Pyramids of Egypt or any other of the monuments 'extant 'in the time of Herodotus.' Neither does he think (p. 445), that the whole world has a much higher antiquity.

perhaps still more practically experienced in Egyptology, MM. Brugsch and Lepsius, are understood to incline in their different publications between 3100 and 3500 B.C. More recently still, these views have been enlarged by Mariette Bey ; and have found a most eloquent exponent in his original countryman, M. Ernest Renan, who has a communication on the subject in the *Revue des Deux Mondes* for April 1865, and insists on a date of at least 4500 B.C. ; while Hekekyan Bey, from a different source, and publishing in London in 1863, states, on page 15 of his erudite and severe work, that the Pyramid of Soris (Osiris) and Suphis dates in B.C. 4863.

All these conflicting determinations are claimed by their authors to be based upon, or at least confirmed by, 'the monuments ;' treated in most cases from a hieroglyphic, but in the last from a hydraulic, point of view. Astronomy has also been tried, and with the following results :—

In 1839 A.D., Colonel Howard Vyse communicated¹ to Sir John Herschel his principal measures of the Pyramid, besides some very crude remarks by previous explorers in 1817 A.D., as to their having seen the present Pole-star, α Ursæ minoris, by looking at night 'near the period of its culminating,'² out of the inclined entrance passage of the Great Pyramid. This statement approached particulars a little more than that of M. Jomard ; who, in the

¹ Volume ii. of his *Pyramids of Gizeh*, pp. 105-109.

² We hope that these gentlemen meant the lower culmination.

great French work,¹ speaks in rather a mystic way 'of the Pyramids having preserved the inappreciable 'notion of the invariability of the celestial pole;' and was more advanced, because the said entrance passage does not point to the place of the pole at all, but to a distance of more than 3° therefrom! Yet the passage, being in the plane of the meridian, there may possibly be some allusion contained *to the meridian transit of a circumpolar star, with a particular north polar distance at the epoch*. Such a phenomenon, however, is by no means, as the explorers of 1817 A.D. appear to have thought, invariable; but alters so unceasingly, and through such large extents, with time,—*i.e.*, the polar distance does, at which any given star will in successive ages cross the meridian,—that, as Sir John Herschel had to explain, the present Pole-star could not by any possibility, or at any part of its diurnal circle, have been seen out of the tubular entrance passage of the Great Pyramid, either at or anywhere near the reputed date of its building; for the star was then so far from being circumpolar, as to be at the large distance of nearly 24° from the pole.

But what time, in that case, did this eminent astronomer take as the date of the building?

He seems to have assumed, that 'the supposed 'date' of the literary world in the year 1839 A.D., or the epoch of 2123 B.C., was *likely* to be true; and then, for the facilities of computation, took four thousand

¹ *Antiquités Mémoires*, p. 531.

years back from 1839 A.D., and computed for 2161 B.C.,—what large star, if any, fit to be a polar star of reference for the naked eye, was at that particular distance from the pole, which would have enabled it to be seen both at its transit of the meridian beneath the pole, and under an angle of altitude at the Pyramid, equal to $26^{\circ} 41'$ —viz., the angle of the entrance passage according to Colonel Howard Vyse. On solving the problem, Sir John Herschel found,—assuming the latitude of the Pyramid at 30° ,—that, at the date in question, the star α Draconis was in the required position within some $28'$; or close enough, in his very competent opinion, to settle that α Draconis was the Pole-star of the Pyramid building day, and of the northern hemisphere of the world, in and about the year 2161 B.C.

This was a most original contribution, and a splendid advance on the style of Pyramid investigation then in vogue; and inasmuch as the date produced, agreed to a handful of years with the approved literary dates of the time,—the question was considered by most men as finally settled. But when, after a few years, the literary dates, under the influence of German scholarship, again rose in amount, and attained 3200 and 3500 B.C.—the α Draconis view dropped out of sight, with any or all men aiming at a 'scholarly reputation;' and at last the Egyptian astronomer, Mahmoud Bey, appeared on the scene, and by means of a theoretical reference of the Pyramid's southern face to the star Sirius,—a

reference conceived in his mind on a particular night during the spring of the year 1862 A.D.,—deduced thence an astronomical date of 3303 B.C. as that of the building of the Great Pyramid.

Astronomy seemed thus as ready to confirm the new literature, when produced, as it had been to side with the old ; and with regard to the 2200 (nearly) date of Sir John Herschel's reference, it might be remarked,—though we are not aware that it has been as yet in print, to assist Mahmoud Bey's and Chevalier Bunsen's side of the question,—that, if the course of *α* Draconis under the influence of precession be traced a little further back in point of time, the star will be found to have reached its closest position to the pole—almost at the pole itself—in 2800 B.C. roughly ; and would again have reached some 3° or 4° therefrom, or be seen at such a height above the horizon as to have its lower culmination in the direction of the entrance passage of the Great Pyramid, in the year 3400 B.C. nearly.

In this manner, too compliant with the received human authority, astronomy received another short meed of praise for its new agreement with the hierologist's conclusions ; and was then betrayed irretrievably when their literary dates were presently taken up higher again, or to 4500 and 4700 B.C.,—with indications too, from M. Renan, that they will shortly be elevated higher still.

Now this is not the usual position which modern astronomy has occupied in questions of chronology ;

and as its failure is due to no real weakness of its own, but rather to imperfect knowledge of the Pyramid forms to which its doctrines have been applied,—it is incumbent upon us to inquire into the matter rather closely; and ascertain, if we can, whether the Pyramid is really capable of giving out determinate, or only indeterminate, answers as to the length of time it has stood upon the surface of the earth.

First, then, let us inquire—

Whether the Great Pyramid is to be regarded as astronomical at all?

Before we can expect to make any advance in this question, we must free ourselves of all mere vague and inferential hypotheses about the Pyramid; and attend more minutely than has been the practice hitherto, to the actual measured and measurable facts still existing upon, or within it.

Quite aware that he had not put out his whole strength on the occasion, the greatest astronomer who has yet taken up the question, wrote, in 1839 A.D.,—that his calculation of a star angle for the Pyramid, might nevertheless ‘be considered quite equal, in point of precision, to any direct observation, that an Egyptian astronomer of that date (2161 B.C.) could have made;’ and in 1849 A.D., publishing on the subject again, after additionally attending to the physical astronomy concerned, the same great authority changed his computed angle

from $27^{\circ} 9'$ to $26^{\circ} 16'$. But that amount of difference, though nearly a whole degree, must still have been thought, rather complacently by its author, to be quite small in comparison to the average error of observation of an 'Egyptian astronomer of the 'period;' because, in seeking for a Pyramid-passage observed angle wherewith to compare his anew computed angle for the Great Pyramid,—the modern physicist, in his book referred to, takes a mean indifferently between angles obtained from *many Pyramids*, and varying from $25^{\circ} 55'$ to $28^{\circ} 0'$.

Now this constitutes towards the Great Pyramid, a strangely unjust procedure; for it overlooks all that building's superior workmanship—so far in advance of what obtains amongst the rest of the Pyramids; and all the *closeness* with which—after employing painful, laborious, and enduring methods of construction—its *three* inclined passages were made to agree with each other. 250 years ago Kepler declared, that if he could only be certain of Tycho's observations within $8'$, he would thereby be able to alter the whole theory of the planetary motions; and he did thereupon succeed in demonstrating, that circular eccentrics were erroneous, and ellipses sensibly true. But what would be thought of any one testing Kepler's triumphant conclusion, by swamping Tycho's observations with others recorded so very badly, as to be seldom within several degrees of the truth!

Yet this is, in effect, what men have been doing

for years at the Great Pyramid. Allowing their prejudices to lead them,—indulging preconceived notions of what an infantine approach only, towards accuracy, could have been made by an *ancient Egyptian astronomer*; and then, forming a resolve not to condescend very far towards such a mere beginner in the first rudiments of the art.

But there is so little known now, of what was practised either by Egyptian, or any other class of men four thousand years ago, or whether an Egyptian astronomer was concerned in the matter at all,—that such prejudices ought not to prevent us from taking account of ancient facts still existing, when they present themselves in a clear manner and measurable shape. And amongst many facts of this order, are the now undeniable ones, that the Great Pyramid has totally different proportions and arrangements from any other known Pyramid; and is no more to be made answerable for their imperfections, than Newton's *Principia* for *Zadkiel's Almanac*. Wherefore, the angle of the Great Pyramid's entrance passage *we* will take only from observations made upon itself; and we shall then find it something capable of being defined within a very few minutes; or, taking the measures of all the instruments employed into account, within a few seconds.

These several angles, and their closeness to each other, as given at length in vol. ii. pp. 144-161, and vol. iii. p. 39, are capable of mechanical testing at any time; but the main point of difficulty that next

arises, is,—where exists any proof of these angles having had an *astronomical intention*?

That the sides of the Pyramid are duly oriented and the entrance passage is in the plane of the meridian, are much towards that end (see vol. ii. p. 194, and vol. iii. p. 109),—has been already accepted, as we have seen, by so eminent a philosopher as Sir John Herschel, and many others. But the hierologists are even now rising up once more to claim the passage as a mere slope necessary for the introduction of a sarcophagus; and ask also, ‘What purpose in astronomical observation could be subserved by a passage which, though looking towards a Pole-star, was blocked up with stone as soon as the building was complete?’

The first objection appears to us of little force, seeing that large tombs near the Pyramid accomplish the same purpose for their sarcophagi, by means of sometimes vertical, and sometimes horizontal, shafts and passages. But the second, is a feature not yet sufficiently noticed among most Pyramid theorists; who, finding the entrance passage open now, are too much disposed to think it was always so, and must therefore have been *intended* to be used as a telescope; or a means of observing stars by daylight,—as the fable reports them to be so observable from the bottom of a well; while another theorist of a different order, inquires, with deep-felt emotion, whether the intention was not rather ‘the levelling a tube at Draco?’

We cannot, however, too fully realize to ourselves, that when the Pyramid builders left the Great Pyramid, its entrance passage was filled up all the way with long blocks of stone, and the outward termination of it concealed in the masonry of the casing. Hence, it could not possibly have been intended for observing astronomy; *i.e.*, the entrance passage could not have been intended to be used, after its construction, for an observatory. Why, then, may be reasonably asked, was so much trouble taken in placing it both in the plane of the astronomical meridian, and at a particular and precise angle of elevation therein?

To this we answer, suitably with all the metrological features of the Pyramid we have yet come upon, 'for the purposes of *symbolical* astronomy; 'for memorializing, by lines, angles, and positions, 'sundry facts in astronomy ascertained previously 'or otherwise,—but necessary to be marked there, 'and rendered readable in after ages, in order to 'carry out the full system of standards originally 'intended. Such a system requires time-measures 'on the large scale, as well as the small, and 'references to star directions are the only means of 'indicating long periods of time with certainty.' Such a destination, then, completely gets over the difficulty of the passage either having been once used for lowering a sarcophagus, if the hierologists will; or having afterwards been built up with solid blocks,—for when these are withdrawn, as they are

now, the passage is again available for its originally intended purpose, if men are only able to read it aright. And we may even add the further confirmation, seeing that John Taylor's theory extended, has already explained so many of the angles of the Great Pyramid with a correctness of a few seconds,—that its expressive lines (see Plate VI.), while they acknowledge that the actual building shows only one, of the two daily meridian transits of a Pole-star particularly marked,—yet accounts for, or shows the direction of the other transit, and the place of the pole as well.

Hence, we conclude the character of the astronomy of the Pyramid, to be *symbolical* only ; and in this view proceed to discuss some existing interpretations.

Siriadic Theory of Mahmoud Bey.

This theory takes for granted, and is founded altogether on the assumption of, such a symbolical character as that just described, and nothing beyond it, belonging to the astronomy of the Great Pyramid ; yet is remarkable for making no mention of α Draconis, or the entrance passage, or Sir John Herschel, or any thing or person whence we have drawn our chief ideas and views.

All the European friends of the ancient name, and warm-hearted promoters of the modern resuscitation of the kingdom, of old Egypt, must have been affected most agreeably to hear of a new astronomical

theory on the age and objects of the Pyramids, being produced in these days by a native astronomer of the Siriadic land ; and they will be equally delighted to find, that in the department of calculation, a full mastery is shown of the best French methods, and a skill that would have adorned a memoir from any countryman whatever. But there is also, unfortunately, a more striking omission still, than any we have above alluded to, and one rather damaging to the author's credit in several ways ; for, with one small exception,—and which rather makes the matter worse,—not only is there no mention of any British traveller connected with either the history, measurement, or calculation of the Pyramid, from one end of the pamphlet to the other,—but the name and labours of even Colonel Howard Vyse, have not the least mention, or acknowledgment, though they really outweigh those of all other travellers, and natives too, put together, for sound and extensive numerical data.

Howard Vyse, as most of the world knows, was at the Pyramid for seven months, working hard with several hundred assistants ; while Mahmoud Bey was there in the year 1862, the date of his paper, only four days with two friends. Hence his measures are merely a few of the outside of the Pyramid, and when he requires some from the other Pyramids he has to refer to Colonel Howard Vyse's measures after all ; but in place of taking them from him directly, with acknowledgment of his

name, which is indeed still in the mouths of all the Arabs about the Pyramid hill,—he, the Bey, takes the Colonel's numbers, from Chevalier Bunsen's copy of them, mentioning only his, Bunsen's name, as though he were the original authority. All this strange proceeding too, is not for the purpose of attaining in 1862 greater accuracy than Howard Vyse reached in 1837 ; for whereas *he* attained the close limits of 2' of error for his angles of the casing of the Great Pyramid—Mahmoud Bey is content to employ in computation an angle for the same, nearly *three-quarters of a degree* different from his own observed, and more than half a degree different from the true, angle. While finally, the Bey more unhappily concludes his omissions of Howard Vyse's name for what he did do, by bringing it in, as '*le Général Wyse,*' for what he did not do, and would have been rather scandalized at its being attributed to him, viz., confirming Bunsen's literary date of 3310 B.C., as that of the termination of the fourth dynasty.

Thus faults there are of commission, as well as omission, in this otherwise very creditable Egyptian pamphlet ;¹ but faults which, depending as they do more upon the tastes, predilections, and perhaps patriotic fancies, rather mistakenly interpreted, of the author,—he has the means of rectifying when—

¹ *L'Age et le But des Pyramides lus dans Sirius.* Par Mahmoud Bey. Alexandria, 1865 A.D. ; reprinted from the Bulletins of the Royal Academy of Belgium, vol. xiv. 2d series, pp. 171.

ever he chooses ; and will doubtless do so in his next publication.

Having now performed all this part of the duty which a simple sense of common justice requires, we can turn calmly and kindly too, to consider the Bey's Pyramid theory on its own merits ; and the statement of it appears to be as follows.

The star Sirius, Soth, or Sothis, the great Dog-star, says Mahmoud Bey, was the god of the dead with the old Egyptians ; and his hieroglyph was a triangle or pyramid, a star, and a crescent. Whereupon he, the Bey, proposes,—that the Great Pyramid was constructed with its southern face,—placed too, as he is most glad to show, very exactly towards the astronomical south,—at such an angle of elevation, that the supposed beneficent rays of the star Sirius should shine down on it, at the moment of the star's culmination in the sky, at right angles to the plane of the surface of masonry ; and therefore in the most powerful direction, he thinks, to transfuse all the substance of the Pyramid ; and, through its solid substance, about 200 feet thick near that part, reach and affect favourably the mummied corpse of the monarch, reposing in his sarcophagus in the dark and mysterious King's chamber near the centre of the building.

As an actual effect, the amount of such favour must evidently be rather homœopathic ; but with that, perhaps, we have nothing to do, the present

occasion being only with the Pyramid as a scientific monument of geometrical design ; and our business, merely to see if the above theory is proved by measurable facts ; for we need hardly repeat, that the theory is purely the thought of Mahmoud Bey's own mind, and can only be received as one expressing also what were the thoughts of the Pyramid builders, according to the proof it may receive from the monument itself.

At present, Sirius, when on the meridian, does not shine down directly, or at right angles to the southern face of the Pyramid, being some 6° too high ; but as precessional movement is concerned there, we may compute back, and find when the star was at precisely the required height ; and that being done, the calculation brings out, according to Mahmoud Bey, the year 3303 B.C. nearly. Nor need there be any doubt about this result being fairly close to the truth ; for the Egyptian astronomer's mode of treating the case is such as to do great credit to his former scientific training at the Imperial Observatory of Paris, not only by his readiness to make practical use of a formula by La Place, but his consideration of the vexed question of the proper motion of the star ; bringing out, indeed, the very remarkable result, that that anomalous movement of Sirius in declination during the last five thousand years has been, probably, to the extent of 3° ,—or nearly one-third of its ultimate amount of precessional displacement. Likewise does the Bey demonstrate

that the *variations* of the proper motion within moderate periods of time have been so marked, and with a tendency to show in past days a greater amount of annual proper motion still,—that it is rather hazardous to fix on what precisely may have been the mean quantity of this anomaly during several thousand years elapsed.¹

In fact, Sirius is a dreadfully bad star to try to fix an ancient date by ; and there is perhaps hardly a worse through all the extent of the sky. An orb it is to wonder and gaze at for its brilliancy ; but what with its recently detected orbital movements round some dark body unknown, or preternaturally dark, if it is known, in addition to all we have previously stated concerning its proper motion,—its place cannot be computed back for long periods of time with anything approaching to the ordinary accuracy connected with what, by comparison with it, may well be called ‘the fixed stars.’

Still, such as it is, Mahmoud Bey computes that about the year 3303 B.C., more or less, Sirius, when on the meridian, must have been in a rectangular direction from the southern face of the Great Pyramid. But he wisely allows that that, by itself,

¹ The following are some of the particulars :—

Declination of Sirius by modern observations in A.D. 1850,	=	-16° 13'
„ by Mahmoud Bey's computation for B.C. 3250,	=	-25 23
„ the same, corrected for a mean proper motion	}	= -22 20
in declination of 2.2" in the interval,		
Observed proper motion in declination between	}	= 1.16"
1750 A.D. and 1850 A.D.,		

is no proof that the Pyramid was built either then or for that purpose ; because an immense number of stars in the course of a night, and with the precessional effect of ages, may be seen for the moment of their culmination, at some date or another, in such a rectangular direction ; and he adduces, as his only proofs of a cogent order, 1st, that the hieroglyphic of the star Sirius, has a *Pyramid* attached ; and, 2d, that his Sirius date agrees with Bunsen's and Brugsch's dates, derived from other sources.

From a mechanical point of view, however, we are inclined to object—


First, that there is nothing visible about the south face of the Great Pyramid, to distinguish *Sirius* from all other stars near its extensive parallel ; or, in fact, to show any exclusive and intended relationship between that side of the building and any star.

Second, The angle of the face of any Jeezeh Pyramid, was a much more exact matter than Mahmoud Bey seems to have been aware of ; and that of the Great Pyramid was set to a very peculiar quantity,—the same, too, within a few seconds, on every one of its faces ; but different by a large part of a degree from any other Pyramid. Now supposing for a moment, that the south face was set to its actual angle to suit the Bey's idea about Sirius in culminating,—why should great pains have been taken to set all the other faces exactly and scrupulously to the *same* angle ; for, at the same angle *there*, or in those directions E., W., and N., they

could not have been equally adapted to receive the utmost transfusion of essence from one and the same star divinity, as that one shining down on the south side. John Taylor's theory, on the other hand, accounts for the angle of every side being similar, and gives an independent statement of what the angle should be, which agrees with fact as closely as the most refined observation can detect. The building is, in truth, excellently formed to demonstrate John Taylor's theory; but by no means of the shape, as a whole, to realize Mahmoud Bey's idea: for that would have been more promising if the south face had been rather concave; and the other three, so decidedly convex,—in order to throw off all other influence there,—that the Pyramid would not have been a pyramid at all, but a huge beehive form, with a large slice cut out of one side.

Third, Overlooking, for argument's sake, the opposition of the actual east, north, and west sides of any Pyramid to the southern star-view theory, and taking only the south side; granting also for the same purpose, that the slope there of any Pyramid was always arranged so as to be at right angles to Sirius when on the meridian at the time of the building,—then we ought to be able to fix the *relative* dates of different Pyramids from the differences of these southern angles. Now, in the case of the seventh, eighth, and ninth Pyramids of Jeezeh, both tradition, and their arrangement symmetrically about the base of the Great Pyramid,

have led almost all men to be confident that they were built subsequently to that mighty monument. Yet their angles being all $52^{\circ} 10'$, according to Howard Vyse, or $52^{\circ} 13'$ according to Mahmoud Bey, quoting through Bunsen,—while the angle of the Great Pyramid is $51^{\circ} 51'$,—that implies, on the Bey's theory, that the former were built in a previous age to the latter, instead of a subsequent one.

Fourth, the hieroglyphic of the star Sirius, is stated by Mahmoud Bey, to be 'a triangle or *face of the Pyramid*, a crescent, and a star,' thus  But a Pyramid, in hieroglyphics, had a peculiar *base* attached to it, as see them in the titles of the Memphite Kings in our Plate XII. (photographed from Dr. Lepsius' *Königsbuch*.) See also p. 523 of Bunsen's *Egypt*, vol. i. The mere acute triangle above given,—a different sign altogether, and far too acute angled to stand for a side of the Great Pyramid,—is said by Bunsen, at his p. 534, to mean (except when employed for Soth), 'a pyramidal cake, a kind of food, 'ragout'; and to represent the sound *sns*.'

Fifth, and last, we have to mention, that Mahmoud Bey's second supposed proof, viz., his astronomical date agreeing with the supposed true date of the Egyptologists,—is cut from under his feet by the further extension, since then, of precisely the same sort of Egyptological inquiries; for these—as effected by his adopted compatriot Mariette Bey in Egypt, and elaborated by M. Renan in France,—have shown, that on the same principles as Bunsen

extended the date of the Pyramid from 2100 B.C. to 3300 B.C., it should now—when the Museum of Boolak has become possessed of more inscribed stones,—be extended from 3300 B.C. to 4500 B.C., at least. In fact, the Siriadic theory is left without any support, and has its most serious refuters in Egypt itself.

a Draconis Theory of Sir John Herschel.

This theory recommends itself much more to the reason than that just described ; because, in the first place,—it bases itself on one Pyramid passage or tube, looking in one direction only, and not on four broad surfaces looking in as many different directions, only one of which is made any use of ; and in the second place,—because the direction in which it does look, being not only in the plane of the astronomical meridian, but close to the pole, appears thereby,—besides being astronomically inclined,—to pick out one particular star, out of all the sidereal heavens ; or at least, to confine itself to a very small circumpolar region of the sky, where the number of large stars must always be extremely limited.

Hence Sir John Herschel, in selecting *a Draconis* as the star to which the Pyramid builders referred, had very few stars to choose amongst ; and has happily selected the one and only star, both large enough to be reckoned a polar guide by primitive men, and which *could* have been in the prescribed position, or $3^{\circ} 42'$ from the northern pole, during all, or any of, the various dates that have been fixed

on by any one whatever, for the Great Pyramid's building. Thus there is every probability that α Draconis, as a particular star, was really made important use of, and much looked to, by the men of the Great Pyramid; and the only ultimate failure in the theoretical scheme is,—the uncertainty as to which of the *two* occasions of that star being $3^{\circ} 42'$ from the pole, viz., before or after, the star's closest appulse to that celestial pole, was *the* occasion intended to be typified. If the latter one was meant, the date must be not far from 2200 B.C.; and if the former, 3400 B.C., nearly: but nothing monumental, in the scientific way, has ever yet, so far as we are aware, been brought up to shed the smallest light on the difficulty.

Sir John Herschel's work, then, was excellent as a scientific performance so far as it went,—but it did not go far enough to reach firm standing-ground; and we have now to inquire at the Pyramid itself, whether there are any further data *there*, by means of which the balance of evidence may be turned to one or the other side; i.e., to show whether the Pyramid was built at the last, or the last but one, occasion of α Draconis being $3^{\circ} 42'$ from the northern pole; and a difference of more than 1200 years waits upon the result.

Pyramid Data.

In taking up the Great Pyramid at this particular point, we must confess to have originally deduced

from, and now to add to, our measures,—a general belief in that building's excellent adaptation to its original purposes, whatever they were. Hence we have been more struck than most of our predecessors seem to have been, with this apparent anomaly,—viz., that if the meridian transit of a Pole-star, at a given polar distance, was the phenomenon to be commemorated in the building of the Great Pyramid,—why was *one* only of the two daily transits marked, and that one the *lower* and less important of the two?

We had, indeed, ourselves pointed out, in 1864, that the northern air-channel seems to be in the direction of the upper transit; but that air-channel is itself balanced by the southern one, and required therewith in a different problem; nor can it for a moment compare in mechanical importance with a passage like the entrance passage, large enough,—and indeed the only one in all the Pyramid,—for men to enter at. Wherefore the anomaly still remains, of the lower and inferior culmination of α Draconis having alone been signally marked; as if, to the builders, it had been vastly more important than the upper and more visible culmination!

Why this strange anomaly, or preference?

'For some good reason,' our respect for the long-buried architects suggested; and the following presently appeared the most weighty, as well as the most simple, reason that could be adduced,—
'Because when that star was crossing the meridian

‘ below the pole, another and more important star
‘ was crossing the meridian above the pole ; and it
‘ is not the manner of the Great Pyramid to wear
‘ its most vital signs “or meanings” in the most
‘ prominent and external situations.’

That was merely an hypothesis to be tested ; and on trying by calculation what star or stars of chief importance crossed the meridian above the pole, and at any polar distance whatever, when α Draconis was crossing below at the 3400 B.C. period, with a polar distance of $3^{\circ} 42'$,—we could find none. But the moment we tried the same thing for its 2200 B.C. epoch, we alighted immediately on the Pleiades.

The Year of the Pleiades.

Now the group of stars variously known as the Pleiades, the Seven Stars, the Doves, Brood-hen, Gluck-henne, Hen and Chickens, Cabrillas, or Little Nanny-Goats, Peliads ; in Hebrew, *Chima*, the Congregation of the Judge ; in Arabic, *Wasat*, or the Centre ; and in Latin, *Vergilia*, also with an allusion to a centre of turning,—are not only an interesting and pleasantly regarded cluster to all men in the present day, but were propitiously mentioned in the Bible as far back as the time of the patriarch Job. They were also, as recently shown by the learned researches of Mr. R. G. Haliburton,¹ very extensively referred to in the earliest of primeval times, as part of a traditional rule of chronology, bearing traces of

¹ Barrister of Halifax, Nova Scotia. See vol. ii. p. 370.

wisdom of so very elevated a character, as to demand at once both admiration and inquiry.

Mr. Haliburton's works, which have as yet only been printed privately in America, appear under the title of 'New Materials for the History of Man, derived from a Comparison of the Calendars and Festivals of Nations : No. 1, Festivals of the Dead' (extending to 104 closely printed pages); 'and No. 2, On the Astronomical Features in the Mosaic Cosmogony' (to 14 pages); and much is it to be hoped that their acute and persevering author will soon be prevailed on to print them in this country for the general public. (See also vol. ii. Section v., Letters of the Freemasons.) In the meanwhile, we may shortly state for him, that the result of his inquiries into the literature of many nations, and the traditions of most existing savage tribes,—has been to find traces amongst them all of their having once employed a common, universal, original system of chronology, based on the Pleiades, and in a manner equally simple and perfect. Thus, the year begins on that one night when 'the Pleiades are above,' or 'are most distinct,' or 'when most is seen of them,' or, in fact, *when they cross the meridian at midnight.*

Now this is a faultless principle of observation, that of a midnight noting of a star when at the culminating point of its celestial path; and one to which modern astronomy can add little else than merely some technical improvement of the means by which the principle is to be carried out; while, as a

working method through long periods of time, for determining the beginning of a new year,—it is not only capable within itself of the utmost precision, but has the same exactness after thousands of years, as after one year,—subject only to a small and very slowly increasing natural correction. Very different, therefore, is this, from the hopeless confusions of calendar which the more civilized nations of the world,—in its subsequent, but still early historical days,—were always floundering in,—from accumulations of the annual difference between the real length of the year and *their supposed* length of it.

Quite a large chapter in the history of the Chaldean, Egyptian, Greek, and Roman astronomy is it, the chronicling the successive approximations made by their astronomers as to the real length of the tropical year, and *their always being wrong*. This was because they never could conceive the idea of the real length being incommensurable in even terms of days ; so that, driven on by their own inventions, they assumed, say 360 days for the length of the year, and then went on counting their years by 360 days, until the difference between that and the true number, or 5·2422, etc., days, mounting up every year,—soon made a calendar that once began at seed-time, appear at length to be heralded in by autumn, or *vice versâ*. Then a new approximation was tried, which brought the calendar year somewhat closer to the natural one ; until the Egyptians,—of a day long after that of the Great Pyramid,—seemed to

think they had attained the very height of all calendar regularity, when they made their theoretic year to consist of 365 days.

Yet even then, they had the confusion, that in the short space in the history of a great nation, of 1460 years, or really a little more,—the seasons of sowing and reaping, winter and summer, passed through every month of the year. The Egyptians tried indeed to make a glory of their error,—for that period of 1460 years, produced from supposing the fraction of a day to be a quarter of a day exactly, they converted into the mystical and highly lauded wisdom of their Sothic cycle. But a most confusing cycle it must have been; repeated itself in the duration of their monarchy more than once; and was endeavoured to be bolstered up, and its single years distinguished by a variety of complicated contrivances, such as the Phoenix cycle, Panegyric Periods, the Triakontaeterides, etc., etc., which have occupied learned men during long ages, and in large books, to try to make either effective or clear.

‘ Did not the Egyptians then know of the simpler, better, and more efficacious Pleiades year?’ is a question that may be asked. And the answer is, ‘ Yes, they knew of it, or had known of it once; for traces and allusions to it may be found in some of their religious rites, especially in the festival of the Isia; but these remembrances seem to have been involuntary on their part; for, in so far

‘as they could, the Egyptians had cut themselves free from the Pleiades year, both as to the stars and the manner of making the observations,—binding themselves astronomical slaves for ever to Sirius Sothis, the great Dog-star, and his heliacal *‘risings or settings.’* Hence our only hope of learning more, of what was in reality a pre-Egyptian institution, would seem to depend on searching the traditions of savage tribes; where, as Mr. Haliburton shows, knowledge is well-nigh absolutely stationary; and thereby reveals to us, in the present day, and equally whether amongst the Australians, Fijians, Mexicans, or Peruvians, that which was once communicated to them, and to all men, long before the days of the first known observations of Chaldean astronomers, or the first recorded thoughts of Phœnician sages; in a word, before any of the Eastern empires which have left any historical traces whatever behind them, had either waxed or waned.

The common possession of this Pleiades year by so many isolated and far removed races of mankind, is a sufficient proof that they did not receive it from any one or other of the great nations of antiquity,—the Egyptian, for instance,—exclusively; for they, the Egyptians, never had any dealings with Australians and Fijians. Besides which, both Egyptians, Greeks, Romans, and others such, in proportion as they advanced in civilisation, academical learning of their own, and national importance, invariably sophisticated down, or thinned away the original

Pleiades method, until hardly a trace remained amongst them, to communicate elsewhere if they would. Thus, not content with the beauty and power of the primitive maxim for observing a star on the meridian at midnight,—*they*, the said great heathen nations, must prefer to observe it when on the meridian at sunrise or sunset, though the twilight nearly rendered the faint stellar ray invisible ; then, the star itself was to be observed at its rising or setting, with the vapours of the horizon added to the difficulties of twilight. And finally, the *ne plus ultra* of impossibility for an observer was fixed on, when the sages of the profane world had got to the furthest possible point from the spirit of the Pleiades method of old ; and instead of fixing the beginning of the year when the sun was at the maximum of distance from the Pleiades, or when these were ‘above’ at midnight, and ‘most distinct,’—they made it when the sun was *in* that group, or its constellation Taurus ; *i.e.*, when the Pleiades were ‘above’ at *noonday*, or, not only not distinct, but absolutely invisible ; and when no man could directly tell, during several months, whether the priests and the almanacs were right or wrong.

The Pleiades method having been thus reduced, in the temples of the most humanly advanced of the heathen nations, to something well-nigh futility,—the arena was considered open to new inventions ; and then began those calendar methods already alluded to, according to imperfect human estimates

of the length of the year in terms of days, which occupied the learning of the classic world through all its history ; exhausted its attention, and kept up its praises and admiration for man and his doings, —has led to dislocations of the calendar again and again, but with glory always to some new man for setting it right for a time,—given different reckonings to different nations at varying epochs,—and is untowardly felt, even in this present age of the world, in the shape of one European people, ‘ who ‘ possess the ninth part of the habitable globe,’ counting their time differently by twelve whole days from all the rest of the civilized world.

Now the original method of the Pleiades would have saved mankind, if they had kept to it after receiving the gift, from all this confusion, intricacy, and waste of human energy ; for it is, in its application, as universal as it is simple and effective ; and can be observed and profited by, wherever man lives on the earth-surface. Not only too, does it enable the beginning of each year to be fixed ; but, if well observed, it proves also what year, each year is, in a something which may be regarded as approaching to absolute chronology ; or in a cycle of time, admirably definite, and so vast, that all the known period of man upon earth, has not yet run through one-fourth part of it ; and the duration of any great nation, nay even the life of a distinct language, has in few cases yet amounted to the one-twelfth part.

Let us explain practically. The Pleiades, as stars, come, and as nearly intertropical stars come very notably and measurably, to the celestial meridian of any place 3 m. 59 s. sooner every night ; therefore any one who can determine when it is midnight, and when these stars are on the meridian to the rude quantity of a minute, can determine on which night such a year begins. But a tolerable astronomer, even with moderate means, can, not only determine that phenomenon far more accurately, or to a single second,—but can measure the place of the star from a definite point, the vernal equinox, to a second of time also, or less ; and the Pleiades increase their distance each year from that point by about 3·5 seconds, through means of the so-called precession of the equinoxes. Hence such astronomer can determine the place of his star on that line of its precessional motion, to an accuracy abundantly within the quantity of a year's movement ; or, in other words, he can settle in which year's place the star is, and how many years have elapsed since the star left its celestial starting-point for measuring from, viz., the vernal equinox. And inasmuch as that grand effect on the places of the stars, the precession of the equinoxes, goes on so slowly, that a star does not travel through its whole precessional cycle, or begin to repeat itself therein until 25,868 years have passed by,—there has been no ambiguity as yet, since man began to chronicle

anything, as to which of its precessional rounds his celestial referring point is in.

This, then, is the chronological system of 'the year of the Pleiades,' as so admirably worked out by Mr. Haliburton from the traditions of all peoples and tongues ; and shown by him to have been more perfectly followed in the ages *preceding* the rise of the great heathen civilisations, than *since*. But granting the correctness of all his eloquent deductions, our readers may ask, 'What are the proofs of that system having been appreciated or attended to by the builders, or rather the planners, of the Great Pyramid ?'

The Pleiades and the Pyramid.

When used at any time, according to the above indications, by men concerned in metrological arrangements, there can be no doubt that the Pleiades must have been to them the most important star, or star-group, by far in the whole heavens. Many other stars may be infinitely more conspicuous, as indeed was Sirius the Dog-star, but its splendour could have been no more than idle tinsel, compared to the metrological aid furnished by the Pleiades under that system. Hence, granting for a moment a use of the system, we may be morally as well as scientifically certain, that for the sake of having the Pleiades commemorated on the meridian *above* the pole, a Draconis,—though otherwise, as for orienting the whole structure, a useful enough star,

—must be content to appear *below* the pole, if the two are to be observed together; especially seeing that at the hour when α Draconis was above the pole (the stars being supposed opposite in right ascension), the Pleiades must have been altogether invisible or apparently under the earth.

At present the two stars,—for it will be convenient to allude to the Pleiades as a single star, selecting for that purpose its principal component, η Tauri, whose Greek name *Alcyone*, when reduced to an Arabic root, signifies ‘the centre,’¹—at present we say the two stars are by no means exactly opposite, being nearly 30° distant therefrom. But neither is α Draconis *now* at the distance of $3^\circ 42'$ from the northern pole, but rather at something like 25° . Compute, however, the place of both stars back, as affected by precession, for every past century; and with every century earlier, α Draconis will be found nearer the north celestial pole, and η Tauri nearer to being opposite to α Draconis in right ascension; until, indeed, after retracing many centuries, you will find there is one, wherein, not only was α Draconis precisely $3^\circ 42'$ from the northern pole—but η Tauri was then also just twelve hours distant from α Draconis in right ascension; or, crossing the meridian above the pole, when the other star was doing the same below the pole.

The ingenious author of the article ‘Egypt,’ in the

¹ *Mazzaroth or the Constellations*. By the late Miss Rolleston. London: Rivingtons, Waterloo Place, 1862.

last edition of the *Encyclopædia Britannica*, does not scruple to say, p. 500, that Sir John Herschel's finding the entrance passage of the Great Pyramid at the time of its building pointed to α Draconis 'is not to be regarded as more than accidental;' and for this one reason only, that 'the entrance passages of Pyramids were always closed at the completion of the building.' Not only however have we removed that objection, by showing that the Great Pyramid is all along, in every one of its features, not an observatory for making new observations, but a place of deposit for remarkable standards of metrology previously in existence,—and requiring in astronomy, solely, that the phenomena of a particular epoch should be memorialized once and for ever,—not only have we thus shown the groundlessness of that objection upon our view of the case,—but now a new star, and the most important of all stars for metrology in the early primeval ages, is exhibited in precise angular coincidence with what was computed for α Draconis in combination with the entrance passage; rendering therefore the chances against the latter being an accident, perhaps seventy times more secure than before.

The Great Pyramid, however, does not leave the matter even in that very nearly established state only, but furnishes further data for conclusion and settlement, of the following order:—

First, for instance, we may now advantageously

take account of Lord Valentia's truly sage critique of nearly sixty years ago ; when his Lordship asked, with all common sense on his side, ' Why, if in the ' opinion of all Egyptologists the Pyramids had been ' built solely to preserve the sarcophagi of buried ' monarchs safely, why did not the builders pull out ' all the fine white lining from the passages, and ' build up the long holes with ordinary masonry, ' like the rest of the mass ; for then half the mountain-like building, or more, would have had to be ' pulled down before the concealed central room ' would, or could, have been discovered ; whereas ' now, with the fine and polished lining left in, ' whether the passage itself be internally stopped up ' or not, the line of it is clearly distinguishable, and ' conducts a depredator at once and inevitably to ' the very chamber where, on the burial hypothesis, ' he ought not to go ? '

We thank his Lordship for the sensible idea ; and can now suggest, that had the builders of the Great Pyramid obliterated its entrance passage in the effective manner proposed by Lord Valentia,—they would not only, in all human probability, have preserved the proposed sepulchral chamber from violation, which seems, from the whole of the facts now known, *not* to have been their purpose ; but they would thereby just as certainly have deprived distant posterity of the required symbolical key, wherewith to unlock the secrets of the Great Pyramid's primeval chronology ; and *that* they seemed to

have most positively desired, *should* one day be understood.

Secondly, as α Draconis,—recovered by Sir John Herschel, through means of the entrance passage being still visible,—may be regarded as the key, and the Pleiades, now found, as the lock,—let us see how the key works in the lock. Wherefore, compute the *absolute* right ascension of η Tauri, when it was at that peculiar *difference* of right ascension just described, or *opposite* to α Draconis at the time of that star being $3^{\circ} 42'$ from the pole, and what do we find? why, no less than this, that η Tauri was then at 0h. of right ascension, or in the equinoctial point itself, *i.e.*, at the necessary and essential starting-point and commencement of all reckonings by Pleiades years; in the very beginning, therefore, of the Pleiades chronology, and at the one epoch of all others during the last six thousand years, and many more too, when, if ever a monument was to be, or could be, appropriately erected to symbolize and commemorate the Pleiades calendar, it should have been erected.

Not only, too, was the epoch thus remarkable in pure astronomy, but in its applied form to agriculture and the general affairs of men, it was equally precise and noteworthy. For when the Pleiades and the equinoctial point were on the meridian together at midnight, then the primeval year began *coincidentally with the autumnal equinox* of the northern hemisphere; and that autumn, as well as

that night became, agreeably with old tradition, 'the 'mother-night of the year.'

Again, Mr. Haliburton's researches have shown (vol. ii. pp. 372 to 438), that amongst most early nations there was a very wide-spread idea of connecting both the constellation *Taurus* and the *Pleiades* stars, with reminiscences of a saving from the Deluge and a beginning of 'sweet influences.' Why there was such a connexion, otherwise most inexplicable, the astronomy of the Great Pyramid seems to furnish a very tangible clue. For, though there was no particular *absolute* change among known stars about the epoch of the Deluge (for whose date see Division III. chap. viii.), yet, viewing them according to the peculiar and very accurate principles of Great Pyramid observation,—there was a Pyramidal *relative* alteration just then of the whole sidereal heavens; and with the effect, of even making the most positive antithesis between the normal constellations for chronological purposes, of antediluvian, on one side, and postdiluvian, times, on the other.

Compute, for instance, for the date of 3400 B.C., or any other certainly antediluvian time, what were the equatorial and zodiacal constellations on the meridian above, when α Draconis was on the meridian below, the pole,—and you will find them to be *Serpens*, *Ophiuchus*, and *Scorpio*. But as the year 2800 B.C. came on, a rapid displacement of those constellations began to be effected, amounting almost to a rushing round of the whole heavens (dependent

on the exaggerated effects of precession on α Draconis, then quite close to the pole of rotation of the sky). And when towards 2200 B.C., the extreme rapidity of that change had passed,—and the dangers of the Deluge also, according to the traditional chronology of every nation,—then, if you compute what constellation was above, when α Draconis was below, the Pole,—and in the direction of the entrance passage of the Pyramid—you will find, that all the former mentioned zodiacal stars are entirely departed from the visible hemisphere,—leaving Taurus dominant in their place, and the Pleiades exactly on the Meridian.

Hence, too, a chronological method for a stellar year, that formerly began in spring, would be changed almost suddenly into an autumn observation,—explaining further traditions. But let us continue to inquire more and more closely into all *our* necessary facts; and, first of all, into the calculation of the proper Pyramid sidereal coincidences, as yet only cursorily mentioned.

Great Pyramid Astronomy.

The general results of our observations in vol. ii., show decidedly that the Great Pyramid, though approaching closer to perfection than most persons had hitherto allowed, is yet by no means an absolutely perfect building; and has certain small probable errors of construction, partly perhaps induced from dilapidation-effects difficult to eliminate, but certainly existing in the present day.

In a similar manner, all the calculations which I am able at present to bring forward, for computing the places of the stars four thousand years ago, though agreeing in the general facts, have some variations. We must not, consequently, expect absolute agreement in the inquiry we are entering upon, but only a practical amount thereof; and then, we shall probably find observation closer together with theory, than different modern observers at the Pyramid have been hitherto with each other.

The circumstances of origin of these almost necessary errors, are not always easy to investigate; and would have been less so still, had not the two stars of Great Pyramid reference, viz., η Tauri and α Draconis, both been as it were so admirably selected in primal times from amongst all stars, for certain qualities of transcendent cosmical physics,—that they have hardly any proper motion at all sensible in the present state of astronomy; hence, full freedom with them, from all the worst of the drawbacks connected with trying to use the Sirius Sothis of Egyptian hierarchy, for any of the grander purposes of long chronology.

The first authority for the calculated places to be presented before our readers, is at least quite a disinterested one,—being a friend of Chevalier Bunsen, and his Pyramid date of 3280 B.C.; viz., the learned Professor Heiss, of Münster. This gentleman's testimony, moreover, was quite unintended; for he

had merely furnished to Bunsen's fourth volume of *Egypt's Place in Universal History*, two star-maps; one of them showing the precessional movement of the pole, and the other the precessional displacement of the equator of the sky, for several thousand years back; and both maps were actually constructed for the purpose of illustrating a point connected with β *Ursæ minoris*, as the probable Pole-star of the ancient Phœnicians. But, as the maps contain, besides many other stars, both α *Draconis* and η *Tauri*, we may as well ascertain what they say about them; and it seems to be as follows:—

1st, α *Draconis* was at $3^{\circ} 42'$ from north pole of sky in year 2071 B.C. nearly.

2d, α *Draconis* at above date, was not 12h. from η *Tauri*, but 11h. 23m.; and

3d, η *Tauri*, was at 0h. A.R., or in the meridian of the equinoctial point, in year 2100 B.C. nearly.

Hence, the first and third phenomena agree very fairly, but the second is largely in error; due, with little doubt, both to the necessary imperfection of small maps, and to these particular star places not having been expected to be called for.

In the second place, we submit two results by Sir John Herschel for α *Draconis* alone. These were both computed for Colonel Howard Vyse's value of the angle of the entrance passage, or $26^{\circ} 41'$, giving $3^{\circ} 19'$ of celestial polar distance. We have, therefore, reduced them to the later more correct determination of $26^{\circ} 18'$ for the mean passage angle, and $3^{\circ} 42'$ for the north polar dis-

tance, using an annual precession in north polar distance of $20''$; and find,—

- α Draconis at $3^\circ 42'$ from north pole, by computation of 1839 A.D.
in 2011 B.C.; and
 α Draconis at $3^\circ 42'$ from north pole, by computation of 1849 A.D.,
in 2158 B.C.

the last being preferred.

In the third place, we submit the results of a computation for each star in both elements, or right ascension and declination, by the formula contained on p. 19 of the Introduction to the British Association Catalogue, and applied to every hundred years;¹ whence it would seem,—

1st, α Draconis at $3^\circ 42'$ N.P.D.,	B.C.	in year 2128
2d, α Draconis and η Tauri opposite, or 12 hours distant in right ascension,	}	" 1550
(And 12h. 15m. 30s. in 2100 B.C., α Draconis following η Tauri by that quantity); and		
3d, η Tauri, at 0h. A.R.,	"	2228

Here the second item is still very discordant, and the first and third not so close as might have been desired; wherefore, we began to suspect the full applicability of the formula, to the very much greater lapse of time it is employed for here, than any which seem to have been contemplated by the worthy Francis Baily, to whose long and earnest labours the

¹ The formula being as follows:—

$$\Delta \alpha = m + n. \sin \alpha. \tan \delta.$$

$$\Delta \delta = n. \cos \alpha.$$

$$\text{where } m = 46.02824'' + y 0.0003086450''.$$

$$n = 20.06442'' - y 0.0000970204''.$$

$$\alpha = \text{Right ascension.}$$

$$\delta = \text{Declination.}$$

British Association owes the opportunity of appending its name to the best star-catalogue the world has yet seen. There is something too, even still, not quite so well understood about the numerical quantity of precession, as it should be; La Place having one annual value, and Bessel another, while an excellent author on physical astronomy printed, a few years ago, the prudent conclusion:—‘This rate of motion, $50\cdot2''$ per annum for precession, is not perhaps sufficiently well determined to make it worth while to compute exactly the time in which the equinox describes the whole heavens, a period between twenty-five and twenty-six thousand years.’

With reference also to some errors that had been previously committed in precessional computations, Sir John Herschel subjoins to Par. 319 of his *Outlines of Astronomy* the instructive note:—

‘On this calculation the diminution of the obliquity of the ecliptic in the four thousand years elapsed has no influence. That diminution arises from a change in the plane of the earth’s *orbit*, and has nothing to do with the change in the position of its *axis*, as referred to the starry sphere.’

Now this paragraph is not a little interesting, as a reminder, and a timely one, of the extraordinary importance in celestial physics of the earth’s axis of rotation; that axis which is already referred to at the Great Pyramid for the standard of linear measure, as well as for weight and capacity measure;

is typified statically, in the vertical height of the Pyramid ; and as to its dynamics, in the base thereof. Most worthily too, for that axis of the earth's rotation, with its uniform rate of turning and power of keeping its own angular position (that is, of following its own laws of slow angular change such as precession, in defiance of other angular changes going on round about it on a vastly larger scale, as in the alteration of the plane of the enormous orbit carrying the earth itself round the Sun),—that axis of the earth's rotation, immaterial though, like the orbit, it be,—is endued with more power of permanency and constancy than any of the other movements or properties of the earth ; and does directly govern both the polar distances of the stars, and all our ideas of, and means for, checking the uniformity of our first invaluable standard and unit of time.

Hence, as the fourth example, we exhibit the results of the computation of $50\cdot211''$ as a mean amount of annual precession for the whole period, supposed to be uninfluenced by any other changes, and then find for—

	B.C.
1st. α Draconis at $3^{\circ} 42'$ N.P.D., the date . . .	= 2170
2d. α Draconis and η Tauri, opposite in R.A. ; first in 1797 B.C. ; second in 2562 B.C. ; Mean, . . .	= 2180
(α Draconis following η Tauri at that mean date of 2180 B.C., by 12h. 5m. 28s.) and	
3d. η Tauri at 0h. R.A. in date	= 2176

The places of the stars in 1800 A.D., and between 2000 and 2300 B.C., being as follows :—

Date.	η Tauri or the Pleiades.		α Draconis.	
	Right Ascension.	Declination.	Right Ascension.	North Polar Distance.
1800 A.D.	h. m. s. 3 35 37.9	23° 28' 32"	h. m. s. 13 58 58.5	24° 39' 59"
2000 B.C.	0 8 59.6	5 22 32	12 12 20.9	4 38 35
2100 B.C.	0 3 52.2	4 49 14	12 8 34.5	4 5 18
2200 B.C.	23 58 45.1	4 15 55	12 4 25.8	3 32 0
2300 B.C.	23 53 28.2	3 42 36	11 59 42.8	2 58 41

Having thus exhibited without favour all the widest variations in results, of which the case seems well-nigh capable,—we may be pretty certain that the true date will ultimately prove to be contained within them; and will be found, if not actually 2170 B.C., at least closer thereto than the beginning or end of the duration of the Great Pyramid's building can be to its middle date.

Star-Maps, explanation of.

In Plates VII., VIII., and IX., the principal features connected with the astronomy of the Great Pyramid, are approximately represented in a graphical form.

PLATE VII.

Plate VII. is therefore a star-map, showing both the place of the pole of the ecliptic and its surrounding sky for a breadth of from 80° to 90°; near the middle of which space, the circle,—described under the influence of precession in 25,867 years approximately, by the celestial pole of rotation traversing round the pole of the ecliptic, or rather round its own mean position during the whole period,—is duly marked; together with the series of actual places successively occupied in that circle by the rotation-pole, at the end of every hundred years, continuously, from 4000 B.C. to 2000 A.D. of the Christian era.

This map is of course independent of the geographical position of the place of observation; and the cosmical accident may

be noticed with interest, that whereas the seven larger stars of the Great Bear are the most easily recognised group in the sky,—and two of the stars forming the preceding side of the square, so-called, in that group, serve as the popular ‘pointers’ to direct attention to, and enable beginners to recognise, the present polar star of the world, or α Ursæ Minoris,—so the two stars forming the opposite or following side of that square are the pointers, even more directly and immediately, to the ancient Pole-star of the world, or α Draconis.

This star will likewise be readily identified by being half-way between ζ Ursæ Majoris, and γ Ursæ Minoris; also, by having another star near it, in the same direction almost as ζ Ursæ Majoris on one side of it, has ϵ of the same constellation, and γ Ursæ Minoris on the other, has β of that constellation: so that α Draconis and its companion are the middle pair, of three parallel-placed pairs of stars, between the Greater and Smaller Bears.

Modern observations do not show any notable proper motion affecting the place of α Draconis; but there is a sensible fluctuation in its apparent brightness, making its limits of magnitude lie between the second and fourth, and in a period amounting very vaguely to some two or three hundred years; so that we are only enabled thereby to say, that at the period of the Great Pyramid’s building, α Draconis *may* have been brighter than it is now, which is somewhere about, and probably rather below, the *third* magnitude, at which we have depicted it.

PLATE VIII.

Plate VIII. is another star-map, but a local one; and representing on a smaller scale, both for the particular year 2170 B.C. and for the special latitude of the Great Pyramid, a meridional strip of the sky extending the whole distance from the southern horizon, through the zenith and to the northern horizon,—with a breadth of rather more than 40° on either side of the meridian. The meridian line, the prime-vertical, the equator, and the pole are indicated by black lines.

The stars represented in this definite space, are those which filled it at the moment when the Pleiades were crossing the meridian, at night,—say rather—as characterizing the season of the year, and a primitive observation for determining the beginning of the year—at midnight.

The map next shows, that the following further coincidences





1

2





Approximate star-map representing for the year 1800 the meridional appearance of the stars, at the time when the Sun is crossing the Meridian below the Pole and the Meridian above the Pole, at midnight, and have the same Right Ascension. Symbols adopted to express the magnitudes or brightness of the stars.

OF MERIDIAN
EQUATOR

ECLIPTIC

Pl. 8.



OF MERIDIAN

or 2170 B.C. and the Latitude of the Great Pyramid,
the instant when α Draconis (at $3^{\circ} 42' N. P. Dist.$)
and Pleiades (near the Equator) are crossing above
the Ascension as the Equinoctial point.

Class of the stars; 1st = \odot ; 2nd = \ominus ; 3rd = \triangle ; 4th = \square




1



Approximate star-map representing, (for the year 1875) the meridional appearance of the stars, at the time they are crossing the Meridian at midnight, but whether they are on the Meridian, either above or below the Pole. Symbols adopted to express the magnitudes or brightness of the stars.



1883 A.D. and the Latitude of the Great Pyramid,) constant when the Pleiades, (now near the Zenith), neither α Draconis, nor any other circumpolar star

ness of the stars, 1st , 2nd , 3rd , 4th .

must have occurred at that moment, and been peculiar to that date of 2170 B.C. :—

1st, The equinoctial point, or crossing of the equator and ecliptic ; and

2d, The Pole-star, or α Draconis, must both have been on the meridian at the same instant, viz., the instant of the Pleiades also being on the meridian.

α Draconis was indeed *below the pole*, but that position, combined with its particular polar distance of $3^{\circ} 42'$ in 2170 B.C., gave it then to observers at Jeezeh, an angular altitude of $26^{\circ} 18'$; or practically the same as the entrance passage of the Great Pyramid, and therefore in so far connecting it therewith.

PLATE IX.

Plate IX. resembles Plate VIII. precisely, in so far as it is intended to show, for the latitude of the Great Pyramid, the appearance of the meridional portion of the starry heavens at night, just at the instant when the Pleiades are crossing the meridian ; but the date, in place of being the long-past date of 2170 B.C., is now the future, or near-present one of 1883 A.D.

With this difference of date, 'precession,' not to say anything of 'proper motion,' accumulating through the long interval, has introduced many changes in the appearance of the usually reputed 'fixed stars ;' as thus—

1st, The ecliptic no longer cuts the equator symmetrically in the same right ascension as the Pleiades.

2d, α Draconis is no longer on the meridian either above or below the pole ; neither is it at $3^{\circ} 42'$ from the pole.

And 3d, No other circumpolar star is on the meridian either at that, or any other, north polar distance : so that the entrance passage of the Pyramid, in the *present* day, points at vacancy ; but assists thereby in indicating the remarkable importance of the several consentaneous phenomena which are depicted in Plate VIII., as then, and then only, or in the year 2170 B.C., accompanying the meridian passage of the Pleiades.

The figures of the constellations which appear in red lines on each of these three Plates, VII., VIII., and IX., are chiefly introduced to render the stars more easily identifiable to readers in the present day ; and not to indicate now, ideas supposed to have prevailed in the primeval world. But as the figures may prove to be a first step towards knowledge in that direction,—the subject will be alluded to again, with such a view, in Div. III. chapter ix.

Great Pyramid Attestations.

Just possible is it now, after having succeeded thus far, in showing astronomical agreements with Great Pyramid construction,—that the supporters of the elongated hierological dates of 3300 B.C., 3700 B.C., and 4500 B.C., etc. etc., may object, ‘that any
‘number of concurring astronomical phenomena,
‘even though indicated in the lines of a building,
‘and too numerous and exact to be attributed to
‘accident, does not *prove the building to have been*
‘*erected at that date*; for the lines might have been
‘computed by theory for so many centuries back,
‘or so many centuries forward, from the building
‘date, when there was no such visible coincidence,
‘or even any approximation to it in the sky.’

Such objection may be made, though with less and less force in proportion to the complication of the problem and the early age of its supposed numerical performance; but the most signal and unique answer that may be returned for the Great Pyramid, of all the monuments in the world, is this,—the Great Pyramid has a theory (John Taylor’s developed), whereby its metrological features have been already abundantly illustrated, and especially the interwoven character of its time, and space, symbols. Now this theory, already honoured with success at many other points, indicates by its lines equally the position of the Great Pyramid *in time*, as *in space*, i.e., in its latitude on the surface of the earth; and

we have visited the building in the spot where it actually stands, and found by measurement that it does sensibly, or to within a few seconds, fulfil the latitude, or space, requirement. Therefore it would seem, that the resulting conclusion should be in favour of a high probability, and something that *must* be admitted until more direct and positive evidence can be adduced on the opposite side,—that if we could by a miracle overtake the time that is passed, and revisit the Jeezeh hill at the date of 2170 B.C., as indicated by the theory, we should certainly find some part or other of the building then in progress; or in other words, the operation itself would be abundantly visible from that computed point of time,—even as the consequences of the operation are to be seen now, from the similarly computed point of space.

And now we come to some further constructive details in the building itself, which are well worth attending to. In Plate VI., the two culminations of the Pole-star, including the polar point, are symbolically indicated in the height of the northern end of the Grand Gallery, as seen from the centre of the base of the Pyramid; and having before remarked that the equatorial line of the sky, as seen from an important astronomical intersection of the base, enters the lower north end of the Grand Gallery,—we may presently add thereto, that the line of direction of the Pleiades, as seen in the year 2170

B.C., or $4^{\circ} 22'$ north declination, approximately strikes the middle height of the Grand Gallery from the same point; a symbolism which, combined with the seven overlappings, might well seem to bear out the ideas of those who have thought, for other reasons, that this slanting corridor was a part of the monument specially devoted to 'the seven stars.'

With our own more practical tastes, however, we rather incline to note the remarkable observing qualifications of the combination of a polar, with an equatorial, star. An astronomer of the present day desirous of obtaining time with the utmost accuracy, procures a transit-instrument, which contains in its collimation, the essence of a T-square,—or of the correct base of a square Pyramid; levels its axis, orients it by looking at the Pole-star when on the meridian; and then, and not till then, observes another star near the equator, to obtain the time by. Even thus does the Great Pyramid indicate that its fiducial lines were first oriented by α Draconis near the pole, and then the time obtained by the Pleiades; which group, though now upwards of 23° from the equator, was in the year 2170 B.C. only $4^{\circ} 20'$ therefrom, or, to all practical intents and purposes, formed a good equatorial 'clock star.' Thus *each* of the Pyramid stars had a special purpose to fulfil; and the astronomy of the Great Pyramid would not have been complete or capable of accuracy, symbolic only, or rather memorial though it be, without both of them being employed.

Neither, perhaps, would the Great Pyramid be thought fully furnished, unless, besides a system for minute accuracy in procuring time at the instant, some further and grander arrangements were made, capable of indicating the total length of the whole cycle, in terms of which such periodical time is to be chronicled,—viz., the full length of the ‘Great Year’ of the Pleiades. Now this is, and must evidently be, the period of the precession of the equinoxes; and we have just witnessed one prudent man of the present day declining to risk the computation of the exact length of the cycle,—so many are the minutely disturbing causes which may be brought to light in its course. Until recently, indeed, the published statements have been very various; or

25,816 years, according to	.	.	.	Tycho,
25,920 " "	.	.	.	Ricciolus,
24,800 " "	.	.	.	Cassini,
and 25,740 " "	.	.	.	Bradley;

but now the number ascertained by Bessel, or 25,868 years, has most favour; and this must be our test,—because the best one available,—of whether the Great Pyramid speaks here also in terms of astronomical truth.

Much struck with having found inches in even hundreds when measuring the diagonals of the sockets (see vol. ii. p. 135), and connecting that with the length of 100 inches representing the time-unit of a day, when the perimeter of the whole Pyramid represents a year, or 100 inches \times 365.242;

reflecting also on the extraordinary importance of diagonal equality to prove a square, and the probability of the symbol of the whole chronological system pervading the entire monument, if any part of it,—I computed the diagonals of the base of the Great Pyramid from the previously observed measures of the sides and angles contained; and then, allowing an inch for a year, the cycle of the Pleiades seemed to appear at once, in the sum of the two diagonals.

9140 British inches, we have elsewhere assumed as the most probable length of one side of the base; and that number being equal to 9131 Pyramid inches, yields, for the sum in question, 25,827 of the same inches. Or if, as we have also shown elsewhere, the base may for some purposes be measured, not on the upper, but the lower surface of the pavement, so as to give 9150 Pyramid inches in the side, the sum of the diagonals then amounts to 25,880 of the same units. The mean of the two, or 25,854, is certainly an amazingly close approach to the 25,868 of Bessel's cycle for precessional change,—or, as usually expressed, for the circle described *about* the pole of the ecliptic *by* the pole of the equator; but perhaps more correctly to be defined as the circle described by the pole of the equator, under the influence producing the precessional movement round its own mean position in space; for the rotation of the mass of the earth about its polar axis is *the* grand fact which rules everything

material, as well in all human astronomy as in the symbolisms of the Great Pyramid.

Conclusion of the Metrological Inquiry.

Let us pause now for a moment, and consider the stage we have reached in this progress of plain mechanical interpretation of the measured facts of the Great Pyramid.

A most comprehensive metrology arranged in five different branches, appears, indeed, to have been discovered, each of them imbued with characteristics of a most commendable, and even excelling, kind ; but the objection may nevertheless, or rather on that very account, be raised,—and we beg to be excused for always relating most fully any or all serious objections whenever we hear of, or wherever we meet with, them,—for our prevailing desire is to afford our readers a full view of either side of the argument, as the only method of ultimately reaching the truth,—the objection, we say, *may* be taken that, *first*, the foundations of the units and standards concerned in that supposed metrology are vastly too high, or deep, or difficult in scientific investigation to have been arrived at by a primitive people ; and, *second*, the units and standards themselves are in every case utterly diverse from the units and standards of the same branches of, or subjects in, metrology, as employed by the ancient Egyptians.

Now the reasons mentioned under these two heads are fairly stated by the objectors ; and the latter one

especially, is most perfectly as well as pointedly true ; and we would ourselves, previous to our experience of the Great Pyramid inquiry, have looked rather suspectingly on any book or person found either attributing to any ancient people a higher degree of acquaintance with astronomy and terrestrial physics than what is certainly known and generally practised in the present day,—or finding something amongst them totally alien to all their acknowledged manners and customs throughout their whole historical period. But any one so doing would be acting to a certain extent under the influence of prejudice in favour of what he knew, or supposed he knew, before ; and would be only justified therein, if his old beliefs were established on very firm data, and the new ideas rested on no additional, or certain, or sufficiently numerous facts to allow of chance coincidences being eliminated, and something approaching to proof established.

So far, however, is the Great Pyramid from being in this latter questionable condition, that it possesses infinitely more facts capable of close and accurate measurement than does any other subject of equally long standing on the surface of the earth ; and we have now before us a greater number of, and more refined observations as to, those facts than have ever been seen in print before. Hence we have considered ourselves not only allowed, but pre-eminently called on, to drop all past prejudices as to what early nations might be supposed able, or not able, to do ; and try

what the measured features of the Great Pyramid, taken merely on their own inorganic merits, can say for themselves.

If, then, after having long followed this, in principle, unexceptionable course, certain all the while of the unrivalled closeness of our measures,—we find developed before our wondering gaze a consistent, continuous, and most philosophic system of metrology, explaining far more of the measurable lines and angles about the Great Pyramid, than any other theory has ever done or attempted to do,—what answer shall we return to the sweeping judgment enunciated by Chevalier Bunsen on p. 658 of vol. iv. of his *Egypt's Place in Universal History*, and religiously believed in, we are told, by a vast majority of the heads in the literary world,—a judgment pronounced, indeed, originally upon Sir John Herschel's and John Taylor's researches, but more applicable now, if at all, to our own? The words are, in the authorized London edition of 1860 A.D. :—

‘The *groundlessness of the fancies* which have
‘been again very recently indulged in about the
‘astronomical purposes of the Pyramids, and about a
‘hidden symbolical system of astronomy, is demon-
‘strated by that thorough conviction which is forced
‘upon us by a view of the monuments and the
‘reading of the hieroglyphics.’

The following is all the answer we propose—
simply to examine the alleged demonstration of
Chevalier Bunsen on the same principles we have

been testing the Great Pyramid by, or with little beyond plain common mechanical sense. On which understanding, let us inquire, first, what monuments these are, so undefiningly alluded to; and, second, what sort of a view of them is it which is required to be taken?

If a material view of any of the standing monuments of the land, we believe that Chevalier Bunsen was never in Egypt to enjoy that important and instructive sight; and if a literary view of them only, through the works of other men, what were the monuments viewed? For if they were not the Great Pyramid, they can hardly be received as being more weighty in a question of and about the Great Pyramid than the Great Pyramid itself! We fear, too, that the mention of 'the reading of the hiero-glyphics' shows that the monuments which the scholarly Chevalier preferred for explaining the Great Pyramid by, were not even other Pyramids of any kind or degree, but merely small buildings or excavations, like the tombs—things of no sort of resemblance to the Great Pyramid, and not unfrequently of a very different age.

Chevalier Bunsen's knowledge of the Great Pyramid's wondrous mass of building, 'in number, weight, and measure,' appears to have been confined to his copyings from Howard Vyse, and to some unfortunately manipulated contributions by Mr. Perring; the Chevalier's statement, too, of these, is accompanied with so many slips or misrepresen-

tations of his own, that in the course of ten pages (155-165 of his vol. ii.) we have marked twenty notable errors of facts and features of mechanical construction.

We do not detail each and every one of these errors here, partly because to find out mistakes in a copyist when the original authority can be referred to, is rather supererogatory for the advancement of science; and partly because, in charity, we remember how very difficult it was in our first Pyramid book of 1864 to realize all the facts of the Pyramid, on other persons' mutually contradicting descriptions alone. But there is one of the faults of the eminent German author of too serious a nature, and too wilful on his part, to be passed over in silence, and it is this,—after having profited his own volumes most largely, both in the plates and descriptions from Howard Vyse's labours, Chevalier Bunsen indulges in successive ungenerous animadversions on the laborious and successful explorer he has been borrowing from. Thus, as one example, M. Bunsen tells his readers, in page 164 of his *Philosophy of History*, 'Vyse has made a collection of quotations from different travellers in the sixteenth and seventeenth centuries, to prove that Dr. Clarke (1801) did his countrymen an injustice by asserting that the sarcophagus was broken to pieces by English soldiers. The French *savants* merely remark that they did not find the lid.'

The first sentence of this extract gives to Colonel Howard Vyse rather a fool's errand to collect quotations of one and two centuries *earlier*, for the purpose of proving that the coffer had not been broken to pieces in 1801 (the occasion of English soldiers visiting the Great Pyramid), when he knew of his own observation in 1837, and all the world did too, that it, the coffer, was not 'broken in 'pieces' even then; but the Colonel is grievously misrepresented by the German philosopher. Dr. Clarke's charge was, see pp. 198 and 199 of volume v. of the fourth edition of his *Travels*, that the coffer 'was entire when our troops were landed in Egypt;' 'that they began, alas! the havoc of its demolition,' 'and left behind them a sad memorial of the British name; but only succeeded in accomplishing a 'fracture near one of the angles.' And to this charge, Colonel Howard Vyse, jealous of the honour of British soldiers under false accusation, showed most conclusively that they did not *begin* the first fractures of the coffer,—because French and Italian travellers of preceding centuries had recorded, and even gloried in recording, that they had broken off, and carried away small bits of it. In fact, Colonel Howard Vyse's note on the subject, at the foot of his 283d page, volume ii., is logical, moral, and eloquent. But what shall we say of the concluding sentence of Chevalier Bunsen's paragraph, already given, under any of these heads; for, as it stands there, it has no visible connexion with what precedes, and when we

refer to the Great Egyptian work for what the French *savants* did say, we find in a note to page 75 of *Antiquités, Description*, tom. ii., not the innocent phrase which Bunsen states is what they 'merely remarked,' but the following version of Dr. Clarke's erroneous charge;—'Since the French expedition, 'the sarcophagus has been broken, as they pretend, 'by English soldiers.' 'Depuis l'expédition Française le sarcophage a été brisé, à ce que l'on prétend, par des soldats Anglais.'

Neither would the untenable nature of Chevalier Bunsen's paragraph have been explained, had more of his preceding matter been introduced, while some of his errors of another kind would have been thereby exhibited; for only six lines previously, he states that the coffer (sarcophagus) of the Great Pyramid, 'is somewhat shallower and shorter, than 'that of the second largest Pyramid.' Shorter it is, but not shallower; on the contrary, very considerably deeper, my measures, and Colonel Howard Vyse's, for the former vessel's depth, being 34·3 and 34·5, respectively; and for the latter's, 29·4 and 29·0 respectively: my own being expressly stated to exclude *the ledge* in both cases; that ledge, which, in the case of the Great Pyramid coffer, is so strange an omission on the part of the French *savants*, and which Chevalier Bunsen does not bring to light.

In fact, upon the proportions of the Great Pyramid, as printed by Chevalier Bunsen, in company with his frequent blunders,—we doubt whether any

metrological theory could be got to hold. But there is no proof yet, that he made even an attempt to see whether such a theory would hold on either his, or any one else's numbers ; and he has therefore no right to issue *dicta*, controlling those who have, and to charge them before the world roundly and utterly with *indulging groundless fancies*.

Hence, there is not one measure of line or angle, and not a single description of material or mode of building about the Great Pyramid, that we have founded on in all the previous pages,—and laid the particulars of before our readers at length,—which need be altered to the smallest extent, at least on account of any of the sweeping judgments, or rather most '*groundless fancies*' and erroneous numbers contained in all Chevalier Bunsen's four large and very learned volumes.

Some small alterations in our final figures, we may have to introduce in future years (if we live to see them), when new, better, and completer observations than our own, shall have been made at the Great Pyramid ; when the four sides of the base and the whole pavement surface shall have been cleared of rubbish ; the portecullis pierced ; the Grand Gallery compared with the Polar star ; the air-channels opened ; and the subterranean water-chamber reached. But in the meantime, we cannot, if we would, escape from the grand and accomplished fact, that a magnificent metrology, worthy of all

attention from scientific, commercial, and philosophic men, has been evolved from a sound method of treatment of all the best obtainable measures of the entire Great Pyramid, both inside and outside, up to the present instant. It is, in fact, the stones of the Pyramid, themselves 'crying out.'

If, then, so much early excellence in pure mathematics, terrestrial physics, and practical art as this resuscitated Great Pyramid Metrology implies,—seems to be inexplicable, as the hierologists insist it is, according to their long-taught ideas of Egyptian society at the period, but yet to stand on a broad and sure basis of mechanical proof of its own,—let us submit those hierological ideas to a more searching scrutiny, from a monumental point of view, than they have ever yet undergone; and inquire thereby, whether the puzzling anomaly complained of, may not prove the forerunner in discovery, of some remarkable events in the history of human life and its trials on the earth.

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DIVISION III.

NOTES IN GREAT PYRAMID HISTORY.

*' When I have bent Judah for me, filled the bow with
' Ephraim, and raised up thy sons, O Zion, against thy
' sons, O Greece, and made thee as the sword of a mighty
' man.'*

ZECHARIAH IX. 13.

NOTES IN GREAT PYRAMID HISTORY.

CHAPTER I.

MONUMENTAL DOCUMENTS STILL TO BE PROCURED.

SUCCESSIVE ages have witnessed both writers and theorists clustering strangely about particular features of the Great Pyramid ; instinctively convinced apparently of something important being there, and fully borne out in such an impression by subsequent discoveries, though all their own guesses were usually very wide of the mark. In the number of such attractions of concealed truth, are to be placed many of the points alluded to in the curious work, of 1706 A.D., attributed to Professor Greaves ; and amongst them, perhaps the following, where the anonymous author writes,—‘ and the best ‘ reason that can be given why they’ (the metrological standards of the Hebrews, Saxons, and other nations commemorated in the Great Pyramid,) ‘ were expressed with so much obscurity, that in all ‘ *likelihood* they might for ever remain unintelligible, ‘ is, that the contrivers of these antient monuments ‘ had a fore-knowledge by Divine Revelation, that ‘ in the latter days they should be understood.’

Without attempting to go to all the serious length and extent of this unknown author,—we would yet remind our readers, that the several features accompanying the peculiar arrangement of joint-lines in the floor of the entrance passage, as discovered by ourselves just under the junction point of its ceiling with the granite portcullis of the first ascending passage,—led us inevitably to the conclusion (vol. i. p. 156) that the builders had left there a sign by which future men, expected to visit the building,—not indeed soon after, but in long subsequent ages,—should be enabled, whatever the language they spoke, at once to find out the particular ceiling-stone which hid the narrow ascent to the Grand Gallery and upper chambers, with all their truly wonderful symbolization of standards in weight, capacity, and time.

As it happened, the key never required to be had recourse to ; for the accidental dropping out of the one important ceiling-stone, when Khaliph Al Mamoon was quarrying in the neighbourhood,¹ disclosed the secret of the existence of the first ascending passage to him and his accompanying Arabs. ‘But would the key ever have been interpreted ‘without such an accident?’—is a question we have already been asked, and by those to whom it is our desire and duty to endeavour to answer as well as we can. Wherefore we reply mainly as follows :— ‘Much, almost everything, depends on the mental

¹ See *Our Inheritance in the Great Pyramid*, p. 86.

'preparation and scientific skill of the modern inquirer.' It is generally believed, for instance, from indications in the classic writers, that the later Egyptians of Persian, Greek, and Roman times had opportunities of passing down the entrance passage and into the one and now well-known subterranean chamber of the Great Pyramid; in monumental proof whereof, M. Caviglia, who rediscovered and cleared out that chamber in 1817 A.D., is said to have found certain smoked inscriptions in Roman letters on the chamber's roof. 'The letters are good uncials, and therefore cannot be of the time of the Khaliphate,' writes Chevalier Bunsen on a subject where he is an authority of power. But yet those Persian, Greek and uncial-writing Roman visitors did not succeed in finding the ascending passages and their carefully hidden, upper chambers; as monumentally testified to again, by the earliest inscriptions *there*, being the Arabic ones either of, or posterior to, Khaliph Al Mamoon and the year 850 A.D. Neither again have any of the numerous visitors in modern times who have tramped up and down that one long entrance passage, believing it to have been constructed for leading to a sepulchral chamber only, or 'for the greater mysteries of the Freemasons,' ever perceived even the existence of the key; but the moment a man entered impressed with the idea of practical geometry having been an aim and object, and in so far the language of the builders for expressing their purposes in,—

so soon the peculiar joint-lines on the floor were discovered.

Not only, too, did we find them thus speedily, and by our measures of line and angle inside the entrance passage,—but they impressed us vividly with the belief, that they were something very peculiar, and most important in the intentions of the builders,—even *before* we had found their relation to the butt-end of the granite portcullis in, or rather above, the passage's roof; for to so marked and signal an extent were they a geometrical anomaly in the otherwise close regularity which prevails in the joint lines thereabout.¹

¹ The construction of the entrance passage generally, and its connexion with the ascending passage particularly, have been strangely involved by Chevalier Bunsen, in his vol. ii. pp. 160 and 162; and to the extent of his at last declaring, that a certain very important and necessary examination is now impossible, which in truth is extremely easy; his least unexceptionable sentence being as follows:—

‘The western passage, which was forced by the Khaliphs, has suffered ‘serious injury, just where the ascending and descending passages ‘meet in the ledge of the rock; so that it is no longer possible to ‘ascertain whether the three great granite blocks placed at the entrance ‘of the ascending passage 14 feet 9 inches long, were intended to conceal one passage, or the other, or both.’

To which let us answer that,—

First, The ascending and descending passages do not meet in a ledge of the rock; but in the midst of masonry.

Second, The western passage of Khaliph Al Mamoon being merely a rudely forced, broken way, smashing through everything that opposed it, can hardly be considered as having ‘suffered serious injury,’ but rather inflicted it upon the entrance and ascending passages, when it met them nearing the point of junction.

Third, Khaliph Al Mamoon’s ‘broken way’ assumes an *enlargement* near the point in question, so as to enable it to compass the ascent from the lower descending entrance passage to the upper ascending passage; and by breaking, as it does, through the western walls of either. But that enlargement, so far from making the task ‘no

‘Granted, however, this much,’ say our questioners, ‘that the diagonal joint-lines in the entrance passage floor would inevitably have been discovered sooner or later; and would also have been perceived (by whomsoever had the fortune to be the original discoverers or subsequent confirmers, of their existence), to constitute an intense anomaly in the Pyramid masonry;—still there is doubt, whether those or any other persons would *thereby* have been led to the further discovery of the particular secret of what lay behind, at the back of, or above, the roof of the passage, opposite to the

‘longer possible to ascertain whether the three great granite blocks placed at the entrance of the ascending passage, were intended to conceal one passage, or the other, or both,’ is precisely what, with the assistance of going into the passages also, enables any one now to study the nature of the said granite portcullis, at its either end, north and south, and also along a portion of one side, the western one; and see with the utmost certainty,—that all three blocks form merely one long cork or plug driven from above towards the lower end of the ascending passage; but not *through* and beyond it into the entrance passage beneath, on account of a contraction in the bore of the channel near the bottom; but still several inches above the roof of the entrance passage (as see vol. ii. p. 41, etc.) So that the blocks are now, and always have been, up *within* the limits of the ascending passage, and never could have protruded down and through, into the lower or descending entrance passage, so as to stop that. And

Fourth, The office of the granite blocks was, therefore, with the ascending passage only; and to *stop* it up, not *conceal* it; for plugging a large square hole in white-limestone with red granite, is rather a way to call attention to the fact of a hole having been made there, than to conceal it. Concealing was required also, no doubt; but that office was undertaken by the limestone block in the ceiling of the descending passage, which entirely hid from view, so long as it was in its place, both the hole formed by the upper passage and its heterogeneous filling; making thereby that particular part of the ceiling of the entrance passage indistinguishable from any other part thereof, for a long way either north or south of it; and in effect, delaying the dis-

'lines on the floor,—unless its nature had been previously disclosed.'

We admit there is ground for the doubt, but not for absolute negation; and while we are exceedingly thankful to have been assisted by the disclosure, as above, having been made before our time,—we would also call attention to one practical result of that disclosure when it was made; and suggest, with the consent probably of every one, that if the ascending passage, Grand Gallery, and chambers of the standards of 50 and 25, had *not* been discovered then, or up to the present time,—the true aims, objects, and ends of the Great Pyramid could have been guessed only very imperfectly indeed: so imperfectly,—that even now, before proceeding any further in our proposed course of historical discussion, the question may be asked with much propriety, whether we are yet in possession of everything material required to be known; or

covery of all the ancient built chambers beyond, to far within the centuries of the Christian era.

In happy contradistinction to the entangling mistakes of Chevalier Bunsen in this matter, is the luminously clear account of Sir Gardner Wilkinson, p. 167 of Murray's *Egyptian Handbook*:—

'On going down the entrance passage, at about 80 feet from its present mouth, you perceive the end of a granite block, which closes the upper passage, and which was once carefully concealed by a triangular piece of stone fitting into the roof of the lower passage, and secured in that position by a cramp on either side. This stone has been removed, and the end of the granite it once covered is now exposed. But the granite closing the upper passage still remains in its original place; and in order to avoid and pass above it, you turn to the right by a forced passage, and, after climbing a few rough steps you come to its upper extremity, and ascend to the Great Gallery,' etc.

whether there may perhaps be still, some hitherto undiscovered chamber of importance in the Great Pyramid?

That numerous persons have fancied there is, the abundant excavations at the well-mouth, north top of Grand Gallery, Queen's chamber, King's chamber, Davison's chamber, and Howard Vyse's huge hole in the south side of the Pyramid, sufficiently attest. Still more too, does the latter's extensive digging in the rock on the north front of the Pyramid; for this proceeding was mainly actuated by the mention in Herodotus, and other classic authors, of the tomb of the King of the Great Pyramid being down some deep shaft, and in a chamber upon an island surrounded by Nile water.

So consistent too are the accounts of the old writers herein, that after concluding all his vain attempts to reach such a chamber, Colonel Howard Vyse still describes himself as under the impression that it will be found some day in the low, as well as aqueous, position foretold.¹ We ourselves also have been much puzzled by the ancient legend, that nearly a third of the time employed in building the whole Pyramid, was spent preliminarily on subterraneous excavations; for the lower parts of the well and entrance passage, together with the one central unfinished subterranean chamber (the only parts now known which can be included in such a description), need not have occupied by any means so long.

¹ See p. 104, vol. ii., Vyse's *Pyramids of Gizeh*.

An uninterpreted Sign.

In connexion then with such views, it is interesting to note,—that if there be any virtue in our supposed key in the entrance passage floor, pointing to the upper chambers of the Pyramid,—the same passage has another key of a closely similar order, alluding apparently to something else not yet discovered, or even suspected. We allude here to the two joint-lines crossing the *walls* of the entrance passage diagonally near its upper end, and quite as striking an anomaly in their way, as are the two in the floor lower down under the granite portcullis. The difficulty however of interpretation in this new case, is, in there being *two* such symbols; or, one pair of lines in either wall. Had the symbol existed on one side only, any one would have said, from experience of the portcullis, ‘Search on the opposite side of the passage;’ but here the opposite side reflects the same signal. What shall be concluded then? The case is open to every one, and fully described in pages 37-39 vol. ii., and in Plates II. and III. of vol. ii.

Our own idea, merely an idea, but derived inductively from known Pyramid facts in other cases, is,—that the direction to search in, lies at right angles to the line joining the two symbols, that is, either straight above or straight below.

Now straight above, thanks to modern dilapidations, we can examine the structure (as see the the Plates in section), and shall then find there the

cyclopean blocks, placed pent-roof-wise, which magnificently decorate the present entrance into the Pyramid. They are unique, too, in the Great Pyramid, for there is not anything similar over the entrance passage of the second, third, or any other known Jeezeh Pyramid; and though the present double set of blocks placed in a single vertical plane, are not precisely over, but rather to the south of, the two anomalous joints of the passage walls below them,—yet there are traces, in abutments left in the masonry, that there were formerly two or three other pairs of similar angularly disposed stones outside, or north, of the present ones; and to such a thickness, that the mean position of this great mass of architectural device was really, when complete, in a vertical above the passage marks below.

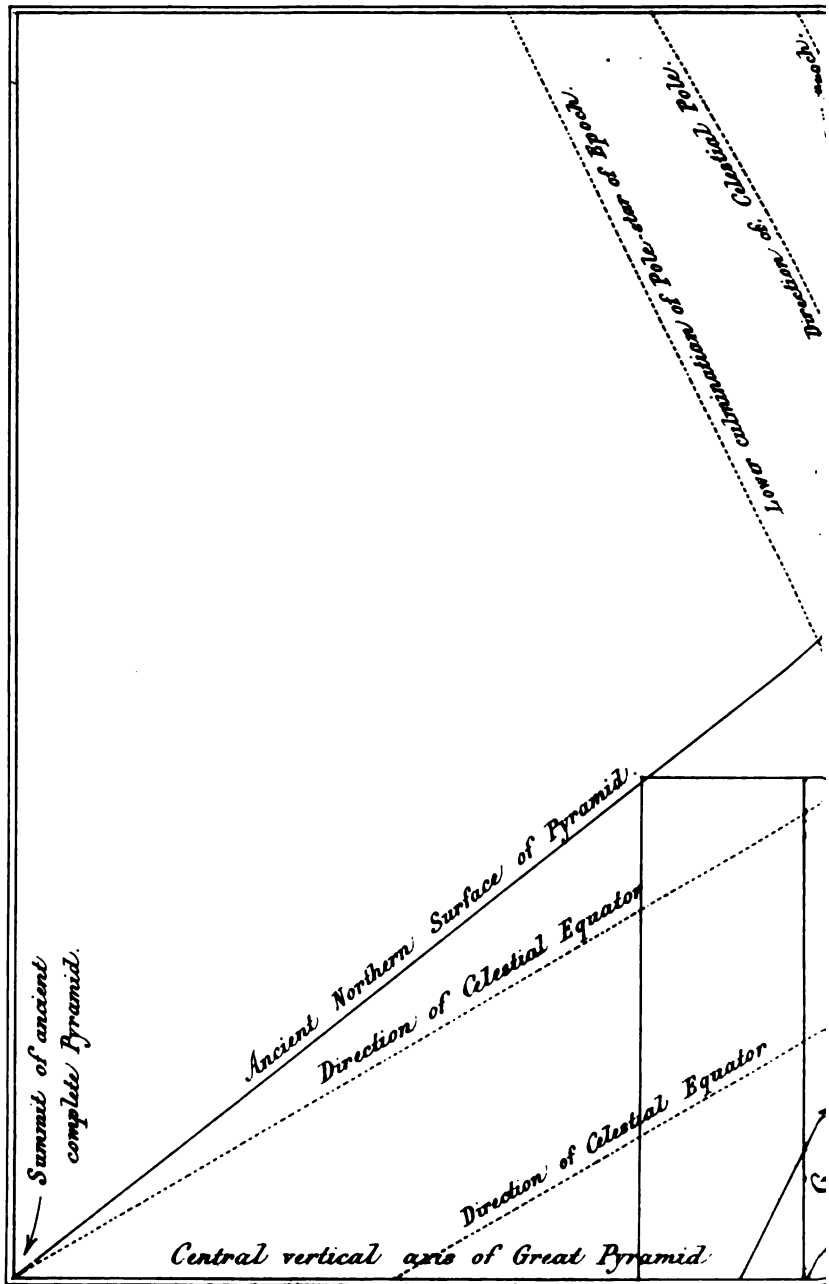
But then what object did these large inclined stones serve?

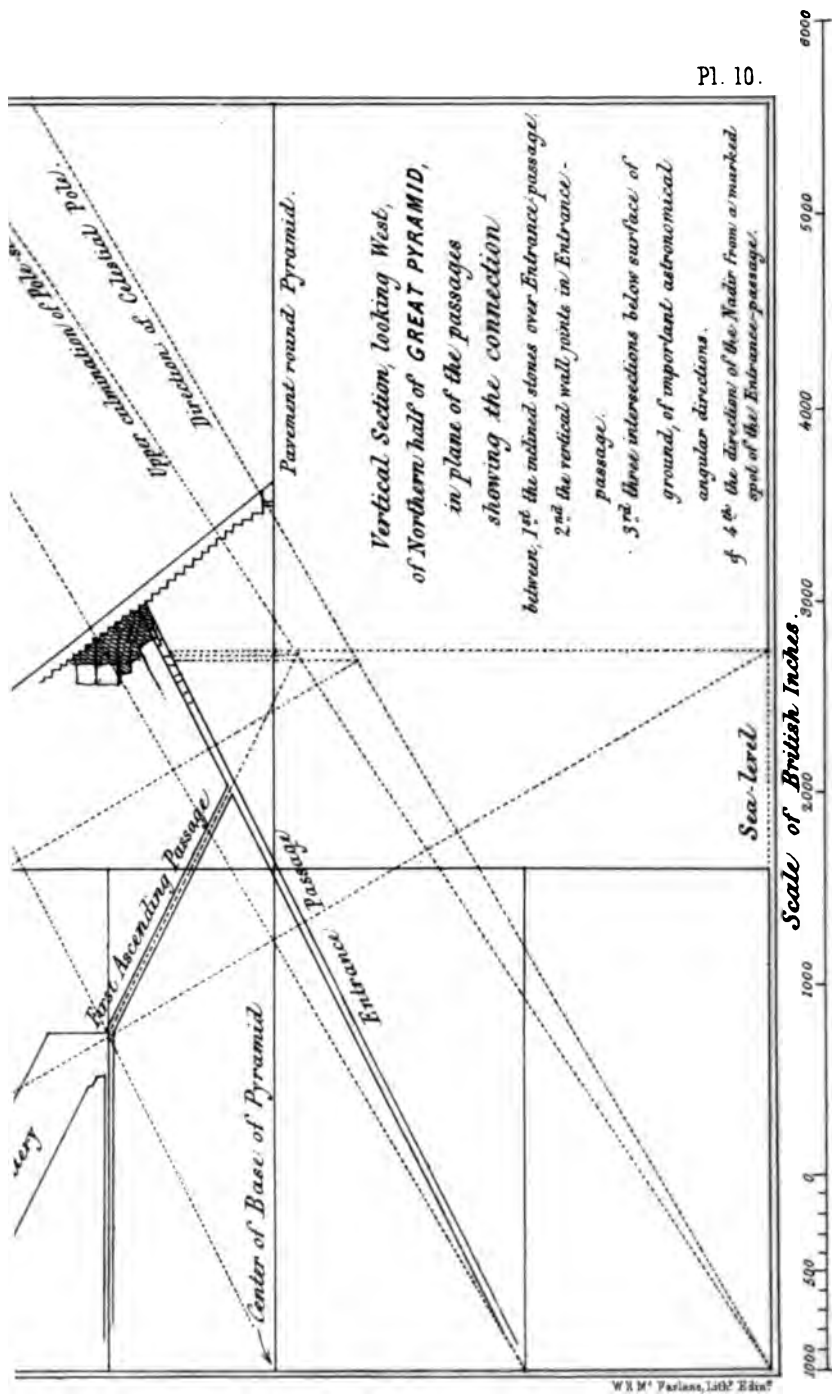
Some writers have suggested, ‘to relieve the roof of the entrance passage from the enormous weight it has to bear of all the upper parts of the Pyramid.’ But Colonel Howard Vyse very properly rebukes these authors, academicians and good mathematical mechanics though they may have been, for not perceiving that the position, close under the sloping side of the Pyramid, secures to these pent-roof-forming stones, their having very little weight to bear. Moreover, if connected with the entrance passage at all, it is only at its outer end, where the pressure is least; for while the pas-

sage *dips* southwards at an angle of $26^{\circ} 27'$,—the basal line of the inclined roof-stones runs *horizontally* southward, and would therefore rapidly leave the neighbourhood of the entrance passage; even if it, the basal line, were to be continued further than where we now behold it; but that is not the case, for the Colonel assures his readers that there is ordinary course-masonry, immediately at the back of the present gable-end blocks we see.

Mechanically, then, these mutually sloping-to-each-other blocks appear to be useless; and would have been so architecturally also in the perfect days of the Pyramid, if, as most probable, or rather quite certain, they were then hidden under the outside coat of the casing-stones of the whole structure. What, then, could they have been inserted for?

We can only suggest, inductively again from what we have observed for ourselves, that they were intended 'to add additional force during the Pyramid's latter days of decay, to the indication that 'opposite to them—or *downwards* through the floor 'of the entrance passage, and between the two 'diagonal points of its walls—is a shaft leading to 'a most important and probably water-furnished 'chamber of the builders of the Pyramid; not indeed supplied by a canal from the Nile, as some 'have thought, but by the same general infiltration 'through the rock, which fills the sepulchral well in 'King Shafre's tomb.' And we are rather confirmed in the notion of such a chamber existing in the





Pl. 10.



locality, both by Plate x., which shows three important astronomical intersections in the indicated direction, and also by remembering the many fragments of *diorite* mixed up with the ancient rubbish on the northern or neighbouring edge of the hill, and unconnectable with anything yet seen by any modern man within the Great Pyramid.

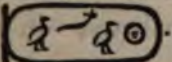
If there really exists such a chamber, the history of the monument will be written far more completely after its discovery, than before ; but meanwhile, as we know of no one likely to undertake the search, and have exhausted all our own small stock of means,—it is our duty now to make what literary use we can of the materials already collected ; and of which the portion now newly added, amounts to a larger mass of Pyramid detail, than was ever before discussed in a serious manner.

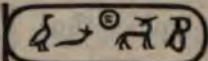
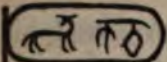
CHAPTER II.

NAMES AND DATES OF THE BUILDERS.

IN the first edition of Sir Gardner Wilkinson's important publication on the *Ancient Egyptians*, but which particular edition is only now to be read for illustrating the advance since made both by the author and his science,—in that edition, we say, of 1836 A.D., there is a well-reasoned-out theoretical, or purely literary, conclusion that the builder, or the king over the builders, of the Great Pyramid, was Suphis ; otherwise and variously called—according to inflections used by different interpreters and nations—Chufis, Shofo, Khufu, Saophis, and Cheops ; or the second royal personage in Manetho's fourth dynasty of Egyptian kings.

Now at the time of Sir Gardner's publication, Colonel Howard Vyse had not yet begun any of his celebrated excavations, nor does he seem to have been acquainted with the published opinion when he did so begin. Amongst the most delightful and satis-

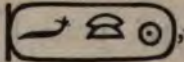
factory instances, therefore, of theory confirmed by fact, must it be classed, that when,—within a year after Sir Gardner Wilkinson's book had appeared elsewhere,—Colonel Howard Vyse broke his way through solid masonry into the 'chambers of construction' of the Great Pyramid, and thereby saw things never intended by the builders to be seen until the final ruin of the long-lasting monument,—he perceived rude paintings or red crayon markings on some of the blocks of stones; and having had them copied by various hands, and transmitted to the learned Mr. Samuel Birch of the British Museum,—that experienced Egyptologist pronounced them to be ancient quarry-marks; and found amongst them the oval of King Suphis, or Shofu, or Khufu; viz., .

Also, these two royal ovals,  , of which the first is certainly pronounced by authority to read Sen-suphis, Nu-suphis, Nu-Shofu, or Knemu-Khufu; and the last is, I believe, accepted as the same name written short, or Knemu or Nu only: equally therefore alluding to the same man; viz., a brother of Shofu, also a king, and a co-regent with him in the fourth dynasty.

These three ovals are the only ones that have been found in any part of the Great Pyramid; and that they really exist in the chambers of construction

there, as described by Colonel Howard Vyse, is testified to by the first page of the third folio volume of large plates by Dr. Lepsius ; where that scholarly and in-the-field-experienced philosopher has had the original red markings on the stone re-copied by his own artists, and has given the oval of Shofu upon an extra large scale, followed by those of Nu and Nu-Shofu on a smaller size.

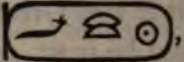
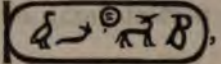
A name erroneously advocated.

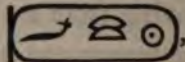
The testimony, then, of the Great Pyramid itself, is simply for Shofu and Nu or Nu-Shofu ; and had, we thought, been allowed by every one, until Chevalier Bunsen, in his second volume of *Egypt's Place in Universal History*, p. 161, made Shafre, Shafra, Sephres, Chephrenes or Chabryes,—in hieroglyphics thus, ,—the principal King of the Great Pyramid : introducing his oval, and his alone, into the text, p. 161 ; ‘for Shafra,’ says he, ‘must either have completed the upper part, or at least have cased and arranged the upper chambers, of the Great Pyramid.’

Now here is very positive language, and from a man of pre-eminent fame as a literary philosopher ; we inquire, therefore, from him himself, whence his reason for adding so notably to the Pyramid's testimony about its regal authors ; and find it in the next line to be,—‘This is the only way of explain-

‘ing his (Shafre’s) title “*the Great of the Pyramid*,”
 ‘and the statement of Diodorus about Chabryes, as
 ‘well as the ignorance of the historians whom Pliny
 ‘consulted, and of which he complains, as to who
 ‘really built it (the Great Pyramid). Shafra’s title
 ‘again, would be most appropriate, if he completed
 ‘it. The king who actually completed this Pyra-
 ‘mid might with perfect right be called the Great
 ‘of the Pyramid.’

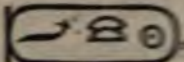
With all deference for the author of this statement, we cannot look on the whole of it as proof; certainly not of that simple and straightforward kind which the Pyramid’s metrological theory has hitherto been receiving from a close and searching examination of the monument itself. In another part of the eminent Teutonic scholar’s deeply-read work (vol. i. p. 163), we are indeed informed that ‘history does
 ‘not admit of the cogent proof of mathematics,
 ‘precisely because her province is an infinitely
 ‘higher one, that of mental and moral conviction.’ But even on these latter grounds, so far as we understand them, it may reasonably be suggested that, because ‘Pliny,’ as above mentioned, complained of the historians he consulted not knowing who built the Great Pyramid, he, Pliny, does not thereby pronounce an opinion in favour of a new and particular name recently produced by Chevalier Bunsen; and as to what Diodorus, whom Bunsen elsewhere calls ‘the bewildered and bewildering,’ says

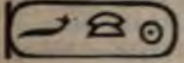
about Chabryes,—the statement is inserted on page 125 of Bunsen's own book, as due to Herodotus ; and a few pages further on the name is identified with Shafra, and Shafra again with Knemu-Khufu ; or, in the Egyptian tongue, , which has never been found inside the Great Pyramid, is made the same with , which *has* been found there, and is perfectly different in all its symbols but one.

Hence we cannot really discover any force in the classical, and less in the monumental, reasons hitherto cited for making Shafre, *i.e.*, , the chief builder or completer of the Great Pyramid ; and the sole remainder of Chevalier Bunsen's proof must rest on his interpreting correctly that peculiar title of Shafre's, which he renders '*the Great of the Pyramid*;' for though, in a following paragraph, speaking of the Queen's and King's chambers in the Great Pyramid, the Chevalier states with the most complete positivism, 'Shafra converted the former 'into the apartment, and made the upper one his 'sepulchral chamber, as appears from his having 'had his sarcophagus introduced into it,'—yet all this is mere assertion, without one particle of additional evidence tending to single out Shafra more than any one else in all Egyptian history as having

performed the works, or owned the serapeum alluded to.

This latter assertion, therefore, as well as the former, equally depends upon the name of Shafre, or

Shafre, , not unfrequently found in neighbouring tombs on the Pyramid hill,—though never in the Great Pyramid itself,—having sometimes a complementary device after it of a bird and a pyramid (see our Plate XII.) ; and upon the true, certain, and correct translation of that device being, as Bunsen gives it, '*the Great of the Pyramid.*' But both Sir Gardner Wilkinson and another hieroglyphist of mark, translate the same device as, '*of the little Pyramid ;*' the bird being said by them to be really a sparrow or swallow, and not a pigeon, as it had been taken for in the '*great*' interpretation. Both these latter authorities, too, place Shafre in the fifth dynasty ; making him represent the Sephres of Manetho ; and our own observations of the entrance passage of the recently discovered granite and arragonite building near the Sphinx,—either the tomb or temple of King Shafre from his statue duly signed

 being found there (see vol. i. chap. xii.),—connects that monarch in a practical manner, and equally whether he was of the fourth, fifth, or any other dynasty,—with the second, and not the Great, Pyramid.

Hence, monumentally, or according to any existing or known direct evidence of the monuments—Pyramids and others—Shofo and Nu-Shofo were the only kings who had to do with the building of the Great Pyramid ; and they both belonged to the fourth dynasty according to the testimony of every modern Egyptological author, as well as of the ancient Manetho.¹ Let us now therefore apply our own monumental and astronomical date from vol. iii. Division II. to that dynasty, and see how it then comports with received chronologies of Egypt. In the following table, accordingly, the first twenty, out of Manetho's thirty, dynasties of kings subsequent to Menes, have their dates entered against them according to the several authorities mentioned at the head of each column :—

¹ One modern writer, indeed, has to be excepted, viz., Hekekyan Bey, in his 'Treatise on the Chronology of Siriadic Monuments, demonstrating that the Egyptian Dynasties of Manetho are records of 'Astro-geological Nile Observations which have been continued to the 'Present Time' (London and Cairo, 1863, printed privately): for this subtle and ingenious theorist, with a good knowledge of mathematics, and of extensive as well as varied and quaint reading, inserts seventeen kings' names into each of the two first dynasties downward from Menes; and makes the second such dynasty include the names of Manetho's fourth; while he completes the whole Egyptian history down to the time of the Persians in twenty-two dynasties, in place of Manetho's thirty. But then, again, the very title-page indicates some new theory with regard to Manetho not a little revolutionary in its character,—as yet unsubscribed to, so far as we can learn, by a second individual,—and not traceable through any series of alleged monuments, in so far as our examination of them has extended.

**MANETHO'S EGYPTIAN DYNASTIES,
DATES AND DURATION OF THE FIRST TWENTY, ACCORDING TO
VARIOUS AUTHORITIES.**

Number of Dynasty.	The most advanced hierologists.	Dr. Lepsius' 'Letters from Egypt,' Berlin, 1852.	Dr. Lepsius' 'Königsbuch,' Berlin, 1858.	Chevalier Bunsen, 'Egypt's Place,' vol. iv. pp. 498-526.	E. W. Lane, Sir Gardner Wilkinson, R. S. Poole, 'Encyc. Brit.'	W. Osburn, 'Mon. History of Egypt,' vol. i. p. 405; vol. ii. p. 632.
	B.C.	B.C.	B.C.	B.C.	B.C.	B.C.
1 {	5735	4800	3892	3623	2700	2429
	5472	...	3639	3434	2480	2329
2 {	5472	...	3639	3433	2480	2429
	5170	...	3338	3210	2080	2329
3 {	5170	...	3338	3433	2670	2329
	4956	...	3124	3210	2440	2229
4 {	4956	4000	3124	3209	2440	2228
	4472	...	2840	3055	2200	2108
5 {	4472	...	2840	3054	2440	2228
	4254	...	2592	2948	1860	2108
6 {	...	...	2744	3054	2200	2107
	...	...	2546	2948	2080	1959
7 {	...	...	2592	2947	1800	...
	...	...	2522	2926	1800	...
8 {	...	...	2522	2925	1800	...
	...	...	2380	2782	1650	...
9 {	...	...	2674	3054	2200	2107
	...	...	2565	2948	1750	1959
10 {	...	...	2565	...	...	1959
	...	...	2380	...	...	...
11 {	...	...	2423	2925	2200	2107
	...	...	2380	2782	2080	1959
12 {	3435	...	2380	2781	2080	...
	...	...	2167	2635	1920	1959
13 {	...	...	2136	2634	1920	...
	...	...	1684	2228	1525	1800
14 {	...	...	2167	2287	2080	...
	...	...	1684	1777	...	1674
15 {	...	...	2101	2547	2080	...
	...	...	1842	...	...	1900
16 {	...	...	1842	...	...	...
	...	...	1591	1777	1800	1900
17 {	...	...	1684	1776	...	...
	...	...	1591	1626	...	...
18 {	...	...	1591	1625	1520	1674
	...	...	1443	1409	1325	...
19 {	1314	1322	1443	1409	1324	...
	...	...	1269	1300	1233	1314
20 {	...	...	1269	1299	1232	1314
	...	...	1091	1115	1135	...

Remembering then, that our astronomical date for the building of the Pyramid was 2170 B.C., we find, on referring to the above table, that there is only one of the authorities, within the alleged period of whose *fourth* dynasty, that date is included. Our result is indeed just outside that of Sir Gardner Wilkinson and Mr. Lane, largely different from Chevalier Bunsen, more so still from Dr. Lepsius, and entirely irreconcilable with M. Renan and Mariette Bey. But we cannot on that account give up our astronomico-architectural determination of the Pyramid's date, seeing that it rests on so large a mass of observations at the Pyramid itself; and is far more direct and cogent in character than the series of indistinct literary probabilities derived from a subsequent age, out of which the early chronicles of Egypt have been attempted to be elaborated, by the world-famous writers in question; and on which, also, they have hitherto arrived at so little agreement among themselves.

Let us ascertain, however, inquiringly, what those authors' foundations are. Early Egyptian monarchs, as every one knows, are always arranged in dynasties; what are these dynasties?

They first appear by name in the work of Manetho, the Egyptian priest of Sebennytyus, in the age of Ptolemy Philadelphus, 280 B.C.; or nearly a hundred years after the last reputed dynasty had expired under Nectanebo II., and four thousand years after the first is *reported* to have begun under Menes. The

'dynasties' *may* have formed a mode of arranging, or talking about their past kings always in vogue among the Egyptian priests; or they *may* have been so arranged first by Manetho himself, as part of a *memoria-technica*, to enable his new Grecian prince, Ptolemy, to acquire thereby more easily a bird's-eye view, rather than a deep knowledge, of the history of the ancient land of Egypt. Certain it is that subsequent critics have been much puzzled to define a dynasty in Egyptian history, so little is there often to distinguish between the last king of a former, and the first king of a following, dynasty; or to show why a dynastic separation should have been made between them.

Certain is it also that dynasties are never alluded to in hieroglyphics of regal names. Hence, when hierologists proclaim that they have found such and such a dynasty on 'the monuments,' they mean, that they have read the names of the kings in the engraved ovals there, and found some of them something more or less similar to certain of the Grecized names in one of Manetho's dynasties. But there was, on the monument, nothing about the dynasty, either in name or number. And, as two of the modern interpreters seldom read a hieroglyphic precisely the same,—and a large amount of latitude is allowed between what they do read, and what is written in the scraps of Greek treatises (through which alone whatever fragments of Manetho's original work still exist, have come down to us),—

we need not wonder at different authorities often varying, as into which dynasty of literary invention to put such and such an oval, cartouche, escutcheon, or hieroglyphic royal signature found on the monuments ; and yet complacently declaring, both that *that dynasty* is found on the monuments, and that the monuments confirm Manetho's dynasties or lists.

Again, even when agreeing as to the number of the Manethoan dynasty to which a particular monumental oval shall be assigned, the modern hierologist authorities are by no means always at one, as to what name to call the said dynasty by ; whether to attach it to Tanis, Memphis, This, or some other city ; and to say, whether its sovereign and his officers were Lower Egyptians, Amalekites, Philistian-Shepherds, Thebans, or perhaps even Negroes ; and whether one dynasty was contemporaneous with, subsequent, or anterior, to some other. Occasionally, too, the same author makes a change in his previous arrangements, on account of some newly discovered fact ; and then the amount of such change is a fair measure of the certainty of the science professed ; as when Bunsen, vol. iii. p. 10, shifts the construction of the Lake of Moeris, at one stroke of his pen, from the first king of the sixth dynasty to the fourth king of the twelfth dynasty.

While as an example of the different conclusions of acknowledged Egyptologists on one and the same inscribed or sculptured remain, the following extract may be quoted :---

'Perring, the Pyramid measurer, has, in a recent publication, attempted to establish the strange notion, which I found also existed in Cairo, that the monuments of El Amarna were the work of the Hyksos (*fourteenth dynasty*); others wished to refer them to a period anterior to that of Menes (*first dynasty*), by reason of their certainly great but not inexplicable, peculiarities; I had already explained them in Europe as contemporaneous kings of the *eighteenth dynasty*.'—(DR. LEPSIUS' *Letters from Egypt*, p. 111.)

These are merely specimens of a very small order of discoveries, ascertained while testing—from a mechanical point of view—the degree of reliance to be placed on the assertions of some one or another very first-rate Egyptologist, when he asserts that he has found such and such an historical fact on the monuments; and that it must therefore be admitted by all the world. But the methods of Egyptologists have been most extensively examined by Sir George Cornwall Lewis,¹ from a *grammarian* point of view; and have unhappily led him to consider—that, 'the operations of Bunsen and other modern critics upon the ancient history of Egypt, rather resemble the manipulation of the balance-sheet of an insolvent company by a dexterous accountant (who, by transfers of capital to income, by the suppression or transposition of items, and by the alteration of bad into good debts, can convert a deficiency into

¹ *An Historical Survey of the Astronomy of the Ancients.* 1862.

'a surplus), than the conjectures of a speculative
'historian, who undertakes to transmute legend
'into history.

'Egyptology,' continues Sir George, 'has an
'historical method of its own. It recognises none
'of the ordinary rules of evidence; the extent of its
'demands on our credulity is almost unbounded.
'Even the writers on ancient Italian ethnology are
'moderate and tame in their hypotheses, compared
'with the Egyptologists. Under their potent logic,
'all identity disappears; everything is subject to
'become anything but itself. Successive dynasties
'become contemporary dynasties; one king becomes
'another king, or several other kings, or a fraction
'of another king; one name becomes another name;
'one number becomes another number; one place
'becomes another place.'

Among examples to illustrate his assertions, the
Right Honourable Baronet cites the opinions of
both Baron Bunsen and Dr. Lepsius, regarding that
potent name in Egyptian antiquity, Sesostris; and
finds at last these two leading Egyptologists,
'though differing in other respects, agree in think-
'ing that Sesostris is not Sesostris.' 'But here
'their agreement stops. One assigns Sesostris to
'what is called the Old, the other to what is called
'the New Empire, separating his respective dates
'by an interval of 3793 years. What should we
'think, if a new school of writers on the history of
'France, entitling themselves Francologists, were to

' arise, in which one of the leading critics were to deny that Louis XIV. lived in the seventeenth century, and were to identify him with Hercules, or Romulus, or Cyrus, or Alexander the Great, or Cæsar, or Charlemagne; while another leading critic of the same school, agreeing in the rejection of the received hypothesis as to his being the successor of Louis XIII., were to identify him with Napoleon I., or Louis Napoleon?'

Even the method of interpreting hieroglyphics according to the principles of Young and Champollion, is attacked root and branch from the same grammarian point of view by the late learned member of the Palmerstonian Government; and he insists that it is to be described only as 'the uncertainty of uncertain conjectures built upon other uncertain conjectures.' But here we can by no means fully agree with the distinguished classic; and can only imagine him to have arrived at such extreme opinions, by attending solely to the points of divergence amongst Egyptologists and hierologists. These are sufficiently wide, and frequent too, to take away from *all* their announcements the positive trust that was for long accorded to them; and by referring to Baron Bunsen himself, vol. i. p. 479, we may instantly see the amount of license with which he would indulge himself, when interpreting old Egypt; for the following series of English words is given as being, each and every

one of them, equally the true rendering of the Egyptian sound *sr*, viz. :—

a camelopard.
 a sheep.
 a spike.
 a species of duck.
 fire.
 to distribute.
 an arrow.
 a chief, a noble.
 to drink.
 a fiabellum.
 cheese ?

But though there be some points extremely unsettled even still among the Egyptologists, that must not blind us to the very great number of points on which they are either perfectly, or almost, agreed ; and do produce nearly identical, and those sensible, phrases out of the same hieroglyphic inscription.

Similarly too, in the vexed subject of the dynasties, they form at least a something tangible on the surface of the dark waters of old historic literature ; they do assist the memory to a considerable extent ; there is not anything else to refer to for first ideas in these distant times ; and, that some portion of them has tolerable certainty, we subjoin herewith, *first*, the designations of the nineteen earlier dynasties ; and *second*, the names of their kings, as given by the leading authors of the most opposite views in various schools of hierology.

MANETHO'S DYNASTIES.

NAMES AND DESIGNATIONS OF THE FIRST NINETEEN, ACCORDING TO VARIOUS AUTHORITIES.

No.	Manetho, in <i>Julius Africanus</i>	Manetho, in <i>Eusebius</i>	Erastosthenes.*	<i>Lepsius</i> ' <i>Königsbuch</i> .	Chevallier Bunsen, vol. iv.	W. Osburn.
1	Thinites.	No name given.	Thebans.	Thinite.	Thinites.	Memphite.
2	Thinites.	No name given.	Thebans.	Thinite.	Thinites.	Memphite.
3	Memphites.	Memphites.	Thebans.	Memphite.	Memphites.	Memphite.
4	Memphites.	Memphites.	Thebans.	Memphite.	Memphites.	Memphite.
5	Elephantinesans.	Elephantinesans.	Thebans.	Memphite.	Elephantinesans.	Abydan.
6	Memphites.	No name given.	Thebans.	Eliphantinean.	Memphites.	Memphite.
7	Memphites.	Memphites.	Thebans.	Memphite.	1 Theban King, p. 504.	.....
8	Memphites.	Memphites.	Thebans.	Memphite.	Memphites.	.....
9	Heracleopolitans.	Heracleopolitans.	Thebans.	Heracleopolitan.	Heracleopolitans.	Sebennyte or Heracleopolitan.
10	Heracleopolitans.	Heracleopolitans.	Thebans.	Heracleopolitan.	Heracleopolitans.	Sebennyte or Heracleopolitan.
11	Diospolitans.	Diospolitans.	Thebans.	Diospolitans.	Thebans.	Theban.
12	Diospolitans.	Diospolitans.	.....	Diospolitans.	Thebans.	Theban.
13	Diospolitans.	Diospolitans.	.....	Diospolitans.	Thebans.	Theban.
14	Xoites.	Xoites.	.....	Xoite.	Xoites.	Xoite.
15	Shepherd Kings.	Diospolitans.	.....	Hyksos.	Arabian Hyksos.	.....
16	Other Shepherd Kings.	Thebans.	.....	Hyksos.	Palestinian Hyksos.	So-called Memphite Shepherds.
17	Other Shepherd Kings.	Phœnician Shepherds.	.....	Diospolitans.	Thebans.	.....
18	Diospolitans.	Diospolitans.	.....	Diospolitans.	Thebans.	Theban.
19	Diospolitans.	Diospolitans.	.....	Diospolitans.	Thebans.	Theban.

* Erastosthenes does not allude directly to dynasties, but each of his kings, whose names, so far as they go, generally correspond closely to Manetho, are entitled as 'of the Thebans.'

KINGS' NAMES IN MANETHO'S FIRST NINETEEN DYNASTIES.

Dynasty.	Manetho in Africanus.	Bunsen, Vol. II.	Bunsen, Vol. IV.	Lepsius' 'Königsbuch.'	Gardner Wilkinson.	William Osburn.
1	Menes.	Menl.	Menes.	Menes.	Menes.	Menes.
	Athotis.	Atot.	Athothis 1.	Athothis.	{ Athothis & others. }	Semempes.
	Kenkenes.	{ Rasmen- them. }	Athothis 2.	Kenkenes.	....	....
	Unepheas.	....	Diabtes.	Unepheas.	....	....
	Usaphaidos.	....	Pemphos.	Usaphais.	....	....
	Miebidos.	....	....	Miebias.	....	....
	Semempes.	....	....	Semempes.	....	....
2	Bieneches.	....	....	Bieneches.	....	....
	Boethos.	Kalechos.	....	Boethos.	....	Cachos.
	Kalechos.	....	....	Kalechos.	....	Raophis.
	Binothris.	....	....	Binothris.	....	....
	Tias.	....	....	Tias.	....	....
	Sethenes.	....	....	Sethenes.	....	....
	Chaires.	....	....	Chaires.	....	....
3	Nephercheres.	....	....	Nephercheres.	....	....
	Sesochris.	....	....	Sesochris.	....	....
	Cheneres.	....	....	Cheneres.	....	....
	Necheropheas.	Ratetkar.	Momkhetri.	Necheropheas.	{ Shofu and others. }	Aches.
	Tosorthos.	Khufu.	Stofkhos Area.	Tosorthos.	....	Sephuris.
	Tyris.	An.	Gosormies.	Tyris.	....	....
	Mesochris.	Seserenra.	Mares.	Mesochris.	....	....
4	Soyphis.	Sahura.	Ancophis.	Soyphis.	....	....
	Tosertasia.	Senefru.	Sirias.	Tosertasia.	....	....
	Aches.	Rasmeser.	{ Khnubos Gneuros. }	Aches.	....	....
	Sephuris.	Rasesernakar.	Rayosis.	Sephuris.	....	....
	Kerpheres.	Aakaru.	Blyres.	Kerpheres.	....	....
	....	Ases Karf.	....	....	....	....
	....	Sent.	....	....	....	....
5	Soris.	Khufu.	Saophis 1.	Soris.	Shofu.	Soris.
	Suphis 1.	Num Khufu.	Saophis 2.	Suphis.	Nushofu.	Suphis.
	Suphis 2.	— Kar.	Menkheres 1.	Suphis (?)	{ Menkere and others }	Nu-suphis.
	Mencheres.	Menkara.	Menkheres 2.	Mencheres.	....	Nephercheres.
	Ratoises.	Raneferkara.	Pammes.	Ratoises.	....	Sesochris.
	Bicheris.	Rashaf.	....	Bicheris.	....	....
	Sebercheres.	....	....	Sebercheres.	....	....
6	Thamphis.	....	....	Thamphis.	....	....
	Usercheres.	Usarkf.	....	Usercheres.	Usercheres.	Usercheres.
	Sephres.	Senefru.	....	Sephres.	Shafra.	Tatcheres.
	Nephercheres.	Raneferkar 1.	....	Nephercheres.	....	Sephres.
	Sisires.	Raneferkar 2.	....	Sisires.	....	Mencheres.
	Cheres.	Ratetkar 2.	....	Cheres.	....	....
	Rathures.	Raneferkar 3.	....	Rathures.	....	....
7	Mencheres.	Harmeren.	....	Mencheres.	....	....
	Tancheres.	Sneferkar.	....	Tancheres.	....	....
	Onnos.	Kaenra.	....	Onnos.	....	....
	....	Raneferkar 4.	....	....	....	....
	....	— neferkar.	....	....	....	....
	....	Neferkar.	....	....	....	....
	....	Sneferkar.	....	....	....	....
8	....	Merenna.	....	....	....	....
	....	Harmankar.	....	....	....	....
	....	Tetu.	....	....	....	....
9	....	Unas.	....	....	....	....

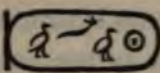
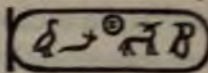
KING'S NAMES—continued.

Dynasty.	Manetho in Africanus.	Bunsen, Vol. II.	Bunsen, Vol. IV.	Lepsius' 'Königbuch.'	Gardner Wilkinson.	William Osburn.
6	Othoes.	Pepl.	Apappus.	Othoes.	Tata.	Cheres.
	Phios.	Mentuhept.	Ekheskos.	Phiois 1.	Papa.	Sentis.
	Methusuphis.	Teti.	Nitokris.	Menthuphis 1.	Merenre.	Onnos.
	Phiois.	Nitakar.	....	Phiois 2.	{ Nitokris and others }	....
7	Menthosuphis.	....	....	Menthuphis 2.	....	....
	Nitokris.	....	....	Nitokris.	....	....
	{ 70 Kings for 70 days }	....	Amyrtaus.	....	....	....
	{ 27 Kings for 146 years }	Mentuhept.	Thuosimares.	....	Ementefs.	Imephthis.
8	....	Hantef.	Sethinilos.	....	Mantoftep 2.	Sennocheres.
	....	Hantefaa.	Semphukrates.	....	Senofrkere.	Menthosuphis.
	{ 16 Kings for 43 years }	Hantef.	{ Khuther Tauros. }	....	Mandothp.	Nubecheres.
	....	Hantef.	Meires.	....	Enentef.	Uscheres 2.
9	....	Rasneferkar.	Tomaephtha.	....	Ammenemes.	Nesteres.
	....	Ranubter.	Soikunis.	....	....	Achthoes.
	Ammenemes.	Seseren Ra.	Peteathyres.	....	....	Ammenemes.

10	Ammenemes.	Ammenemes 1.	Ammenemes.	Ammenemes 1.	Osirtasen.	Sesortosis 1.
	Gesongosis.	Sesertesen 1.	Stammenemes.	Sesortasis 1.	Amunmhe 2.	Ammenemes 2.
	Ammenemes.	Ammenemes 2.	Sistosis.	Ammenemes 2.	Osirtasen 2.	Sesortosis 2.
	Sesotris.	Sesertesen 2.	Mares.	Sesortasis 2.	Osirtasen 3.	Sesortosis 3.
11	Lacheres.	Sesertesen 3.	....	Sesortasis 3.	Amunmhe 3.	Ammenemes 3.
	Ameres.	Ammenemes 3.	....	Ammenemes 3.	Amunmhe 4.	Ammenemes 4.
	Ammenemes.	Ammenemes 4.	....	Ammenemes 4.	....	Skeniofris.
	Skeniofris.	Sebeknefra.	....	Sebeknophris.	....	....
12	{ 60 Kings for 453 years }	Shetenra.	Siphah.	60 Kings (?).	{ Sabaco and other Ethiopians }	{ Menthesu- phis 2. Sechemetes.
	....	Rasenkhet.	Phuoro.	....	....	Sabacon 1.
	....	Sebekhept 1.	{ Amuthar- teus and 60 Kings }	....	....	{ Sabacon 2 and others.
	....	{ Sebekhept 2, and others. }	....	....	....	....
13	{ 76 Kings for 484 years }	Rakhuteti.	{ 76 Kings ? No names. }	Amuntimasa.	....	{ 5 Kings in chamber of Thawek.
	....	{ Rakherp- kar and others ; doubtful. }	....	Ammenemes.	....	....
	....	....	....	Tisaken.	....	....
	{ 6 Kings for 484 years }	....	Salatis.	Salatis.	....	....
14	....	....	Buon.	Banan.	....	....
	....	....	Apakhnas.	Apachnan.	....	....
	....	....	Apophis.	Apophis.	....	....
	....	....	Jannas.	Anan.	....	....
15	....	....	Asses.	Aseth.	....	....

KING'S NAMES—continued.

Dynasty.	Manetho in Africanus.	Bunsen, Vol. II.	Bunsen, Vol. IV.	Lepsius' 'Königsbuch.'	Gardiner Wilkinson.	William Osburn.
16	{ 32 Kings for 518 years? no names. }	....	{ 32 Kings for 511 years? no names. }	Ra-Apepi.	....	Saites.
	....	....	....	....	....	Aphophis.
	....	....	....	....	....	Melanoros.
	....	....	....	....	....	Jamne.
17	{ 43 Kings for 151 years? no names. }	Tanaken.	{ 17 Kings for 131 years? }	{ Amosis and Ne- phris. }	....	....
	....	Nakhara.	{ Mentuo- phis and others. }	Amenophis 1.	....	....
	....	Aahhept.	....	Tuthmosis 1.	....	....
	....	Raspenneb.	....	Tuthmosis 2.	....	....
18	....	Khames.	....	Tuthmosis 3.	....	....
	Tuthmosis.	Aahmes 1.	Amosis.	Tuthmosis 3.	Amosis.	Amosis.
	Chebron.	Amenhept 1.	Amenophis 1.	Amenophis 2.	Amenoph 1.	Chebron.
	Amenophis.	Aahmes.	Tuthmosis 1.	Tuthmosis 4.	Thothmes 1.	Mesphrus.
	Amesses.	Tetmes 1.	Tuthmosis 2.	Amenophis 3.	Amun-nouhet.	Achencheres.
	Mephres.	Tetmes 2.	Tuthmosis 3.	Xuenra.	Thothmes 2.	Amesses.
	{ Mephra- muthosis. }	Hatast.	Amenophis 2.	AI.	Thothmes 3.	Thothmosis.
	Thmosis.	Tetmes 3.	Tuthmosis 4.	Tutan Xamun.	Amunoph 2.	Acherres.
	Amenophis.	Amenhept 2.	Amenophis 3.	Horus.	Thothmes 4.	Armais.
	Horus.	Tetmes 4.	Horus.	....	Amunoph 3.	{ Ameno- phis-bake- naten. }
	Akencheres 1.	Amenhept 3.	....	....	Horus.	....
	Rathotis.	Horus.	....	....	Rathotis.	Encheria.
	Akencheres 2.	Amenhept 4.	....	....	....	....
	Akencheres 3.	Aakhenaten.	....	....	....	....
19	Armais.	AI.	....	....	....	AI.
	Rameses.	Titi.	....	....	....	Chebron.
	Armesses.	Amentuankh.	....	....	....	Tal.
	Miamu.	....	....	....	....	{ Ameno- phis-Mem- non. }
	Amenophis.	....	....	....	....	Horus.
	Sethos.	Rameses 1.	Rameses 1.	Rameses 1.	Rameses 1.	Rameses.
	Rampses.	Seti 1.	Sethos 1.	Sethos 1.	Sethi 1.	Sethos.
	Amenephtes.	Rameses 2.	Rameses 2.	Ram. Miamun.	Rameses 2.	{ Sesostris- Rameses. }
	Rameses.	Menephtah.	Menophtah.	Menephtes.	{ Pthah- men. }	Siptha.
	Ammenemes.	Sephtah.	Sethos 2.	Sethos 2.	{ Pthah- men-seep- tah. }	Thutoria.
	Thutoria.	Amenamhes.	....	Men. Sipthas.	....	....
	....	Seti 2.	....	Sethnechthes.	....	Amenophis. Sethos 2.

An attentive examination of the preceding tables will probably convince any one, that of all the earlier dynasties, their recording authorities are more unanimous about the *fourth* than any other, declaring it to be Memphite ; and of the kings in that dynasty, the same voices are more confirmatory of the once real existence of Shofu and Nu-Shofu, as variously inflected, or of  and 

than of any others.

Now these are the two kings' names which the Great Pyramid itself shows in the quarry-marks of the chambers of construction. Of that there can be no doubt ; and the only remaining possibility that we see, to prevent the Pyramid's own symbolized date of 2170 B.C. being given to those kings and their dynasty, depends on the following consideration :—

In several of the buildings around the Great Pyramid, stones have been found with hieroglyphics on their lower sides, or in such a useless position, that travellers have unanimously declared they must have been taken out of an older building, and used over again as mere raw material in the new. Is it possible then that these now marked stones in the Great Pyramid, and of which the markings are often upside down, were similarly taken out of an older building ; and that their present employment may therefore be of a date long subsequent to the inscriptions and the lives of kings Shofu and Nu-Shofu ?

After rather strenuous efforts to find something in this idea, we have been obliged to abandon it, for the following reasons :—

First, The signatures are not hieroglyphics, only quarry-marks ; they give, indeed, approximately the figures of the hieroglyphics, or are in the hieroglyphic language pure and unadulterated ; and are not in the enchorial, demotic, or other forms of writing subsequently found in use amongst the Egyptian people for ordinary purposes. But quarry-marks are radically different things from hieroglyphics, in that economical sense which we have shown elsewhere to have ruled throughout the Great Pyramid building. Hieroglyphics, for instance, as their name imports, must be cut, carved, or engraved into the stone ; always a long, laborious, and expensive process, but so attractive in appearance when executed, as to have therefore ever been a favourite method of decorating, as well as ‘rendering vocal,’ Egyptian public buildings. Hence travellers have had common sense on their side, when they have deemed that no one would take the trouble to carve hieroglyphics on the surface of a large, well prepared stone, and then turn that surface inwards and bury it in the composition of a rubble wall, side by side with ordinary rough stones.

But quarry-marks, on the other hand, are merely the rudest outline imitation of hieroglyphic figures ; linear daubs put on the stone with a piece of chalk, or a coarse paint-brush, and with a freedom and

carelessness which show they could hardly have occupied the artist-workman more than seven seconds each, in the execution of any regal name. Such is certainly the full extent of time which the rude, almost ridiculous representation of King Shofu's two walking birds (chicks or quails), the horned viper and solar sieve, in the oval found by Howard Vyse in the Great Pyramid's chamber of construction, need have employed. Hence, if *such* works are turned inwards when building a wall, no offence against economy is committed, especially if the marks had already been of some other service. Now the service performed there, is plain enough, when both Howard Vyse and Perring inform us, that these red markings are found only on the Mokattam limestone, whose blocks had to be cut and squared on the opposite side of the river, and, indeed, of Egypt. Baron Bunsen, no doubt, in his vol. ii. p. 164, tells us that they, the four low flat-ceiled chambers, 'are all from 2 feet to 4 feet 10 inches high, and cased with granite,' when quarry-marks might have been looked for in vain. But this is only another of the great word-philosopher's blunders when treating of mechanical facts, and of which he gives an additional instance in the very next line by writing—'above them lies Campbell's tomb.' 'Campbell's chamber,' it is, if you like, *i.e.*, one of the five chambers of construction built inside the Great Pyramid, and merely to be a hollow (unenterable by man), for relieving the ceiling of the

King's chamber from too much weight,—but 'Campbell's tomb' is the name applied, by the same explorer who named the chamber, to that magnificent and easily enterable tomb near the Sphinx ; a real tomb with sculptured sarcophagi of the age of the twenty-sixth dynasty, and totally unconnected with the Great Pyramid in any and every way.

The Campbell's chamber too, would have been well worth more exact attention from the celebrated philologist ; for there it is, that in the highest of all the five chambers of construction, and far above any other known chamber in the Pyramid, the oval of Shofu is found. And his too, is the only legible oval in that room ; so that if any name were required to indicate who was 'the completer of the Pyramid,' surely that proud title, together with its supposed consequent in fame, 'the great of the Pyramid'—must be the due of Shofu, and of no one else, according to the testimony of the stones of the Pyramid itself ; and there is no need to bring in any other king, when his, Shofu's, name is actually written up in the sole and highest and most significant place.

In our Plate xiv. vol. ii., we have endeavoured to insert the quarry-marks on the walls of the chambers of construction, as described by Howard Vyse ; and they will be found,—by attending to the symbolism of granite and limestone in section,—to appear on limestone-lined walls only.

Hence we may perceive that the ovals and red

figurings in the chambers of construction of the Great Pyramid, are merely passing daubs of quarry-marks connected with certain special blocks of limestone brought from a distance; and are markings most probably put on at the quarries, while their purpose was served when the stones had been safely conveyed to the builders of the Pyramid. Wherefore, though stones with the quarry-marks of Shofu and Nu-Shofu—as the reigning monarchs of Egypt—*might* have been subsequently taken out of an old building of *their* day, and inserted upside down or in any other way into a new edifice of a later date,—their is no pressing economical reason why the particular stones of the *chambers of construction* should not have been similarly misplaced, as to the mere reading of their quarry-marks, at their *first* as well as last occasion of being builded into a wall in the time of Kings Shofu and Nu-Shofu.

Second, we may remark, that while it is easy to imagine the builders of any little tomb in the neighbourhood, pulling a few stones out of the Great Pyramid for their petty purposes,—it is much more difficult to fancy the builders of the Great Pyramid supplying themselves with stones for their gigantic purpose out of the comparatively Lilliputian tombs, temples, or any work erected by man, either far from, or near to, them; for all such edifices would afford but a drop to the required bucket. There is no visible symptom too now, of the Great Pyramid being a patch-work building, made up of heterogeneous

materials in size, quality, and intended uses, aims, or ends; but everything, on the contrary, shows one grand uniform idea to have extended through the whole structure, and that its materials were procured by application to nature, or nature's earth-stored supplies, direct and immediate.

And *third*, we are informed that all authors, of every nation and every varied form of chronological belief, have invariably considered hitherto, that the quarry-mark ovals in the chambers of construction were originally drawn for the Great Pyramid works; and thereby prove convincingly under what kings these works were carried on.

Clashing Result.

Hence the whole monumental conclusion, formed by combining the quarry-marks of the Great Pyramid with whatever is to be trusted, or is tolerably agreed upon, among Egyptologists, and both of them with our astronomical date of the building,—can be no other, than that two of the kings of the fourth dynasty of Egyptian history, Shofu and Nu-Shofu by name, lived through a period including the epoch of 2170 B.C.

We do not wish to conceal in any way, but rather to call attention to the circumstance, that this date compels us to differ totally, as regards date, from all the famous hierologists, save one, of modern times; and makes our study of the Great Pyramid, according to the careful measure of its lines and angles,

lead to an entirely different result from that attained by those eminent men. (See Table on p. 321.) To their astonishing learning in many points we bow extremely low ; but yet can no more think of denying, or fearing to acknowledge, the existence of those lines and angles which we have measured in the Great Pyramid, and on which we found, or to uphold their contemporaneousness with the Pyramid's building, and to insist on the importance of their scientific interpretation,—than any one else could deny the existence of the Great Pyramid in Egypt, or of Egypt in the world.

Let us pause, however, for one moment in the course of our impartial mechanical investigation, in order to ascertain into whose company our first step into the history of the Great Pyramid has brought us.

CHAPTER III.

HISTORICAL AUTHORITIES.

MR. OSBURN,—the one historian into the very middle of whose date and duration for the fourth dynasty of Egypt, the epoch 2170 B.C. falls,—was only brought to our attention very recently, and then by an accident; but after having experienced something of the earnestness of his manner, and thoroughness of his style of investigation,—we procured one after another of his works, tracing thereby the growth of his knowledge of Egypt, her monuments, and both ancient and modern language, continually increasing through a long period of years, until it may be considered to culminate in his *Monumental History of Egypt*, published in 1854.

His grand and abiding purpose appears to have been, to ascertain if the unlocking of the written materials of Egypt by Champollion's method of interpreting hieroglyphics, would disclose any traces of the sojourning of the Children of Israel in the Nile-land, or anything bearing on the Bible records of early events transacted therein or connected therewith.

‘ Is it not marvellous that they can now read the

' old Egyptian readily, and understand its grammar ?
' These Egyptian discoveries are likely to be one of
' the greatest wonders of our age,'—had written the
late Dr. Arnold ; and William Osburn pressed forward in his younger life, with a youthful enthusiasm which did not tire during thirty years of devotion to the task, in order to acquire this power both of reading and of grammar, that it might be employed on the one chief object of his life. To prepare himself worthily, therefore, for his subject, he appears to have visited Egypt, made himself well acquainted with its physical features and climatic experiences, studied its monuments *in situ*, and copied hieroglyphics with his own hand,—over and above the never-ceasing task of making himself familiar with all the idiomatic particulars of the Coptic language, the extensions of hieroglyphic interpretation-methods, the works of modern hierologists, and the remains of all authors of antiquity who have treated on Egypt.

Hence while he is often going over the same ground as Gardner Wilkinson, Rosellini, or Lepsius, there is a difference in his manner ; with him no dallying by the road-side, entranced by vivid details of private life in ancient times, or the skill of ancient workmen, or the often intricate details of idol and animal worship ; that is, for their own sakes,—for he does not neglect such topics altogether, but keeps them in due subservience to his own grander object of pursuit, and estimates their true

value by the light of a more advanced civilisation and a purer religion. To trust no one of intervening times, seems to be a notable principle with him ; and after sifting to the utmost all that has come down to us from Alexandrine Greeks, his principal labour begins with the unravelling the tissue of fictitious history composed by the ancient Egyptian priests, and recorded by their despotic monarchs on the exteriors of their temples, in a land of eternal slavery, where none dare openly contradict what was appointed to be inscribed. For this remarkable purpose Mr. Osburn makes abundant use of the hieroglyphics found on private tombs, sealed up in their own day, and only recently disclosed by excavations ; but thereby in their turn unfolding for the first time the opposite side, to the official side, of Egyptian history ; and delightful is it to observe his astonishing facility in dealing with the hieroglyphic characters of every age, and either in large or small amount.

But he, Mr. Osburn, is not perfect ; for we have already, in vol. iii. p. 104, exposed his lamentable error as to the material of the ancient casing of the Great Pyramid ; and could now add thereto his further errors, of placing Heliopolis opposite to, or east, instead of north-east, of the Sphinx ; and alluding to the still remaining portion of the casing of the second Pyramid near the summit as being of plaster, and the lower part as having been of ‘ granite of a *vermilion* colour, pieces of which are

‘lying about in abundance.’ These are real and melancholy facts ; and when we sought very recently to enter into correspondence with him, it was mainly to inquire how he had contrived to fall here and there into such astounding mistakes respecting simple things,—for they constituted the exceptional feature to the general rule of his otherwise admirable work and its precise character.

To our extreme regret, however, one of his publishers, and then another, though having a kindly remembrance of the man, and instituting special inquiries after him, were unable to procure any tidings ; and by a secretary and member of a scientific and literary society to which he had once belonged, we were only further told,—that he had been much asked after of late, both in London and at Leeds, where he had once resided, but he had not been seen at either place now for many years ; not, in fact, since an unfortunate break-up in his pecuniary affairs,—a sudden and total loss of all his private fortune, they feared, by the failure of a bank in which he had deposited whatever he possessed, and to the chief director of which, very shortly before the crash came, he had dedicated one of his learned volumes in sincerity of friendship and confiding trust. Since then,—and whether *all* the particulars were exactly so or not, was somewhat uncertain,—our chief informant repeated, ‘Mr. Osburn had not been seen, and every one now ‘believed he was dead.’

This, then, would seem to have been the melancholy end of a man of peculiar talent, high resolve, noble purpose, and magnificent ideas of devotion in a good cause,—and his works alone now speak for him in the world. What is thought of him generally we know not; and the only expressed opinion we have come across anywhere, is a passage in Chevalier Bunsen, vol. iii. of *Egypt's Place in Universal History*. The name, indeed, is differently spelt, but there can be no doubt it is intended for the author of the *Monumental History of Egypt*; the date of which is also sufficiently indicated by the relative time-allusion thereto, seeing that Bunsen's preface to his English edition was written in November 1858. The passage runs as follows:—

‘Unfortunately, too, we are obliged to say of Mr. William Osborne's work on Egypt, which appeared two or three years ago, that, from a critical point of view, it has no value whatever.’

Now, Chevalier Bunsen having previously laid down, in his vol. i. p. 163, that ‘Criticism is the testimony of a scholar who tests the evidences of the past,’—we must confess that this definition appears to us most admirably descriptive of the general contents of Mr. Osburn's historical volumes. And if there is any large difference between his criticism and Chevalier Bunsen's, it is first, that William Osburn translates the hieroglyphics originally for himself, instead of depending, like Bunsen, in the

majority of cases, on two friends always at his elbow ; and, second, that Osburn's critical testing of the evidences of the past, has led him to a different result from that arrived at by Bunsen. Here we suspect is the chief grievance of the complaint ; and if Chevalier Bunsen had, since his time, been proved independently to be right, by the grand test of whether his method of procedure led to truth or error,—there might be no resisting his *dicta*. But on one side, the same methods of philosophizing having since been taken up by the more brilliant M. Renan, have led him to chronologies so much greater than Bunsen's, that these latter have all their once supposed strength completely taken out of them ; while, on the other hand, our recent mechanical and scientific investigations on the Great Pyramid, within their own circle, emphatically declare Bunsen wrong and Osburn right.

Osburn, and Ancient Writers.

One charge is still indeed pressed in some quarters, viz., that W. Osburn's method was merely an 'idle attempt to collect evidence ;' and this is thought very seriously of, because Bunsen has written (vol. i. p. 163), 'to faith it is immaterial whether science discover truth in a spirit of scepticism or of belief,—and truth has really been found by both courses, but never by dishonesty or *sloth*.' Now, that idleness of such a kind is not to be charged against Mr. Osburn, the list of his principal

published works below sufficiently attests.¹ While, that it is not proper to term the attempt 'idle,' in the sense of any proper principle of research having been interfered with, when he determined to study Egyptology with reference to one particular class of research only,—may be considered by the public to appear from the title of a great association which has recently arisen in this country,—is at this present moment forming auxiliary committees in every town and city through the length and breadth of the land,—and claims to have been founded expressly and approvedly 'for the accurate and 'systematic investigation of the archæology, topography, geology, and physical geography, etc., of 'the Holy Land, *for Biblical Illustration.*'

Leaving then any further defence of Mr. Osburn's style of research to this new society,—one important and most difficult branch of whose work he laboured at long and successfully through years of solitary, and unsympathized, toil,—we only demand leave to include him amongst our great philologists-of-reference; and can assure our readers of being enabled thereby to lay down a broader and more

- ¹ (1.) An Account of an Egyptian Mummy. Presented to the Museum at Leeds. 8vo, 1828
- (2.) Ancient Egypt: Her Testimony to the Truth of the Bible. 8vo, 1846
- (3.) Antiquities of Egypt. 8vo, 1847
- (4.) Israel in Egypt. 12mo, 1853
- (5.) Monumental History of Egypt. 2 vols. 8vo, 1854
- (6.) Genesis and Exodus Illustrated from Existing Monuments. 12mo, 1856
- (7.) Israel in Egypt. 2d Edition, 1856

secure track over the morass of doubt, and dark pits of oblivion, which beset man's present knowledge of the affairs of the world, as transacted four thousand years ago.

Thus when Baron Bunsen, with his vast erudition and transcendent critical powers, has gone over the ancient field, in vain searching for any counter evidence,—and when he asks,¹ ‘can it then be accidental that everything which has been quoted from the theological works of Manetho by classical or ecclesiastical writers up to the time of Theodosius, indicates a man of sound reason and sobriety, and of extraordinary learning in the antiquities of his nation? . . . and would the same man, by altering the lists of the kings, which we have now authentic proof he had before him, have stamped himself as a deceiver and an empiric?’—then it is that Mr. Osburn steps in with a word of caution in due season. For how does Manetho's sound and sober history of Egypt really begin? With the following statement, according to Bunsen himself:—

	Years.
(1.) Dominion of the Gods, in two divisions, lasting for . . .	13,900
(2.) Dominion of Heroes, in two divisions, . . .	1,255
(3.) Heroes and Kings of the primeval race, transition from divine to human history, . . .	5,813
(4.) Purely human history—provincial princes ;	
a. Kings without particular notices (of Thebes?),	1817
b. Thirty Memphites (Lower Egypt), . . .	1790
c. Ten Thinites, . . .	350
	— 3,957
Sum-total, . . .	= 24,925

¹ *Egypt's Place in Universal History*, vol. i. p. 66.

And this long series of rulers and kings is anterior to the usually-referred-to thirty dynasties of subsequent kings, beginning with Menes, all of them equally constituting what Manetho teaches as real history ; and if his name is usually connected with the latter reigns only, it is because his original work has perished ; and so far, fortunately for his character, the notices now existing of what he did write, are only the more probable parts of his narration, as culled by the criticism of Africanus, Eusebius, Syncellus, and other early Christian writers of the North African school. But even with the well-known thirty dynasties, Mr. Osburn further points out that Manetho describes, arranges, and numbers them so as to extend ostensibly over 5462 years, but says in a more private manner at the end, and in a mode provocative of many doubts, that they really lasted only 3555 years : and we may add, that even this quantity seems about one-third longer than the empire of Egypt actually lasted. While Sir George Cornewall Lewis does not scruple to say, after referring other lists of primitive kings in reputed ancient chronologists, to the productive powers of late fiction :—‘The list of Manetho, must, in like manner, be regarded as the result of his own invention ; aided, doubtless, by some traditionary names and stories received from his predecessors.’

The only subsequent author to Manetho in the antique world, having any independent claim to chronological authority, is Eratosthenes ; the Cyre-

nian Greek, supposed to have been librarian in Alexandria in the days of Ptolemy Euergetes (247 B.C.); a shrewd man, but picking up his information at second hand among Greeks only; and now entirely lost, as to his writings, except for some few quotations from him that have come down in other authors. Yet upon Eratosthenes does Chevalier Bunsen rely implicitly, as an unexceptionable source and unquestionable canon of early Egyptian history, —even with as firm a faith as, on the opposite side, Lepsius adopts the shorter, and M. Renan the longer, summation of Manetho; while even William Osburn, who is usually full of praise for whatever he thinks worthy in Bunsen, is obliged to speak of one particular attempt of his to establish a forced meaning of a particular passage in Eratosthenes, ‘as a favourite theory of his, Bunsen’s, which he seems disposed to support at a considerable expense of historical probability, and perhaps also occasionally of accurate rendering of the text of his Greek authorities as well.’

Greek and Roman Travellers.

From these doubtful views, therefore, among the chronologists professed, we turn to Egyptian travellers, foremost amongst whom stands the venerable Herodotus. He, though a pure Greek, was earlier than the native Egyptian Manetho, having visited the ancient land about 445 B.C., when Egypt, though already passed over by the destroying hand of

Cambyses, was enjoying rest and independence once more for a brief interval. But though Herodotus is worthily immortalized for his writings in history, and though every one speaks lovingly and with praise of the simple, confiding, inquiring, childlike, manner of the blue-eyed Herodotus,—he wrote of Egypt, not a history, only an account of what he had seen and heard there; stories founded on history perhaps, but with their chronology utterly wrong, doubled up and twisted in and out. Wherefore it is, that even his great admirer Chevalier Bunsen ‘lays it down as established,’—

‘That the chronology of Herodotus, in the proper sense of the word, (only) begins with Psammetichus; that for the previous period he possessed no expedient by which the discrepancy between the Egyptian computation and his own series of dynasties could be reconciled; that these two systems differ by about ten thousand years, and that neither consequently can be considered as either certain or possible.’ As a traveller, then, only can Herodotus be received in his Egyptian writings; and as a Greek traveller, knowing no language other than his own native tongue; dependent, therefore, on interpreters in all his communications with the people; seeing everything, moreover, through the medium of Greek idolatry, and believing that Greek gods and Greek men had been the founders and originators of everything else upon earth. These imperfections, joined to the tactics of Egyptian

priests and the trickery of the dragomans of the time, —Mr. Osburn in his critical examination of passages sometimes breaks out with virtuous indignation on ‘the imposition which had been practised upon the ‘father of history by his unprincipled guides and ‘informants in Egypt,’—were greatly in the way of the eminent Halicarnassian arriving at the mind of the Coptic land: and have now, to a great extent, deprived his works of that full and perfect credence which they implicitly commanded amongst his own countrymen for several centuries after his death.

Of Diodorus Siculus, who followed in about 58 B.C.; Strabo in 18 A.D., and Pliny in 70 A.D.,—or closer to our own times than to those of the Great Pyramid,—they contain so little in addition to what is related in Herodotus,—that, though they are all to be read and pondered over in connexion with other sources of information, and have been abundantly presented before the British reader again and again by Sir Gardner Wilkinson, Corey, Rawlinson, and others,—still the reader may gladly accept of Bunsen’s proposition to ‘leave at last all this chaff, and ‘turn to the monuments;’ for her monuments are undoubtedly Egypt’s peculiar glory, and the veritable, and only extant pages of her most ancient experienced history.

Characteristics of Egyptian Monuments.

‘No nation of the earth,’ writes Chevalier Bunsen, with expressive eloquence, ‘has shown so much

‘zeal and ingenuity, so much method and regularity,
‘in recording the details of private life as the
‘Egyptians. No country in the world offered
‘greater natural facilities for indulging such a pro-
‘pensity than Egypt, with its limestone and granite,
‘its dry climate, and the protection afforded by its
‘desert against the overpowering force of nature in
‘southern zones. Such a country was adapted not
‘only for securing its monuments against dilapida-
‘tion, both above and below ground, for thousands
‘of years, but even for preserving them as perfect
‘as the day they were erected. In the north rain
‘and frost corrode, in the south the luxuriant vege-
‘tation cracks or obliterates the monuments of
‘time. China has no architecture to bid defiance
‘to thousands of years,—Babylon had but bricks,—
‘in India the rocks can barely resist the wanton
‘power of nature. Egypt is the monumental land
‘of the earth, as the Egyptians are the monumental
‘people of history. Their *contemporary* records,
‘therefore, are at once the earliest and most certain
‘source of all Egyptian research.’

Similarly, too, and even more instructively, does the great Lepsius write :¹—

‘An intense desire after posthumous fame and a
‘place in history seem to have been universal in
‘ancient Egypt. This exhibits itself in the in-
‘credible multitude of monuments of all descrip-
‘tions which have been found in the valley of the

¹ Lepsius' *Einleitung*, freely translated by W. Osburn.

‘ Nile. All the principal cities of Egypt were
‘ adorned with temples and palaces. Towns of
‘ lesser note, and even villages, were always dis-
‘ tinguished by one temple at least,—often with more
‘ than one. These temples were filled with the
‘ statues of gods and kings, generally colossal, and
‘ hewn from costly stones. Their walls also, within
‘ and without, were covered with coloured reliefs.
‘ To adorn and maintain these public buildings was
‘ at once the duty and pride of the kings of Egypt.
‘ But even these were rivalled by the more opulent
‘ classes of the people in their care for the dead,
‘ and in the hewing and decoration of sepulchral
‘ chambers. In these things the Egyptians very far
‘ surpassed the Greeks and Romans, as well as all
‘ other known nations of antiquity.

‘ Still further to enhance to after times the value
‘ of these ever-during monuments of ancient Egypt,
‘ it was universal with the inhabitants to cover
‘ their works of art of every description with hiero-
‘ glyphics, the purport of which related strictly to
‘ the monuments on which they were described.
‘ No nation that ever lived on the earth has made
‘ so much use of its written system, or applied it to
‘ a purpose so strictly historical, as ancient Egypt.
‘ There was not a wall, a platform, a pillar, an
‘ architrave, a frieze, or even a door-post in an
‘ Egyptian temple which was not carved within,
‘ without, and on every available surface, with pic-
‘ tures in relief. There is not one of these reliefs

‘ that is not history, some of them actually repre-
‘ senting the conquests of foreign nations ; others,
‘ the offerings and devotional exercises of the
‘ monarch by whom the temple or portion of the
‘ temple on which the relief stood, had been con-
‘ structed. Widely different from the temples of
‘ Greece and Rome, on which inscriptions were
‘ evidently regarded as unwelcome additions, form-
‘ ing no part of the original architectural design,
‘ but, on the other hand, interfering with and mar-
‘ ring it,—the hieroglyphic writings were absolutely
‘ essential and indispensable to the decoration of a
‘ perfect Egyptian temple.

‘ This writing, moreover, was by no means con-
‘ fined to constructions of a public nature and of
‘ great magnitude, such as temples or tombs, but was
‘ also inscribed on objects of art of every other con-
‘ ceivable description. Nothing, even down to the
‘ palette of a scribe, the style with which a lady
‘ painted her eyelashes with powdered antimony, or
‘ even a walking stick, was deemed too insignificant
‘ to be inscribed with the name of the owner, and a
‘ votive dedication of the object itself to his patron
‘ divinity. Inscriptions with the names of the
‘ artists or owners, so rare on the remains of Greece
‘ and Rome, are the universal rule in Egyptian art.
‘ There was no colossus too great and no amulet too
‘ small to be inscribed with the name of its owner,
‘ and some account of the occasion on which it was
‘ executed.’

(Here, then, is some idea of the vast storehouse of materials for the early history of the world, contained in the monuments of Egypt. There is nothing at all approaching it in any other land whatever, either in quantity, precision, or preservation; it is a phenomenon in the history of the human race, and formed a task so exceedingly important in itself for the world to have executed for its future use and behoof,—while Egypt was so precisely the country in which it would be in every way best executed,—that there seems, to our humble and distant contemplation, less than usual of the vanity of human works attachable to those toil-worn records of the old Egyptians.)

Nay, there would even appear to be also a something about those marvellous remains, symptomatic of their having been a task appointed by Divine Providence for the Egyptian people to perform in their day; and they did perform it well. A suggestive idea, perhaps, but one which we shall not attempt to follow further; as all that we have really to attend to at present is this, viz.,—that these most remarkable and speaking monuments, *having* come down to the times in which we live, duty calls upon us to examine their weighty testimony—and with all, and whatever, amount of power we may be able to bring to the task—in the difficult, though happily limited question, which is more immediately set before us.

CHAPTER IV.

EARLIEST PROVED POINT OF EGYPTIAN HISTORY.

FROM all the characteristics, then, of Egyptian monuments, as described by the most eminent hierologists, we may gather the useful warning, that when a date is fixed 'by the monuments' in Egyptian history, it must be fixed indeed. Hence have arisen very strong remarks addressed to those maintaining opposite views, and couched in such terms as these :—

'We may venture to assert, without being charged
'with temerity by competent authorities, that, in
'consequence of Egyptian researches, the arbitrary
'barriers which Jewish superstition and Christian
'sloth have erected upon God's free field of human
'history are for ever broken down ;¹ and again,—
'There exist Egyptian monuments, the date of which
'can be accurately fixed, of a higher antiquity than
'those of any other nation known in history, viz.,
'above five thousand years. This fact must be explained : to deny it would be proof of little skill,
'and still less candour, on the part of any critic, who
'has once undertaken to prosecute the inquiry.'²

¹ Bunsen's *Egypt*, vol. iv. p. 20.

² *Ibid.* vol. i. p. 28.

These builded monuments of old Egypt do thus in very truth come before us in every way, indirectly as well as directly ; gaunt witnesses which will be heard ; they are the facts which must be satisfied, and to which everything else that can be referred to for very remote illustrations, is entirely subsidiary. No matter what course of criticism is adopted, as many writers insist, or what road of inquiry is taken, so long as those positive points, those veritable blocks of granite, are taken up at last,—for omitted they cannot be. History,—say these instructors of the people,—in its scientific form, has to deal, not with the question of probability, but of evidence ; not with eloquently-drawn inferences, but with positive data, if at all. And again,—‘ The task which European science has now to perform, is to bring that (Biblical) tradition within the pale of history, i.e., to deal with it conscientiously and honestly, and to analyse it for the purpose of discovering what is the truth which is to be gleaned from it. Of course we must here take our stand on the Egyptian monuments and records, including the language, and cannot make Biblical research the starting-point. It should be still more evident that the whole inquiry stands upon the ground of philosophical history. And yet, with the growing and preposterous claims advanced by the clergy to fabricate even historic truth, and with their strenuous exertions to destroy historical science wherever it is possible, in order to bring us back to the dark

'ages, it has now again become the more imperative
'to state this in plain terms. It is almost more
'necessary, indeed, to lay great stress upon it in
'Protestant than in Catholic countries. For dog-
'matizing Bibliolatry, the superstitious use which
'Protestants make of their Bible as a cloak for in-
'dolence and want of reflection, must produce the
'effect which scholasticism and hierarchical tyranny
'have produced in the south of Europe,—a total
'abandonment of all scientific study of the sacred
'records. Ignorance marches step by step with
'perversity, and scepticism with superstition.'¹

'The nineteenth century has in the last thirty
'years witnessed, together with immortal discoveries,
'the most senseless and shameless attempts to re-
'establish in the world ancient and modern fraud,
'falsehood, and nonsense, and pass it off as ortho-
'doxy. Posterity will find in the noble love of
'truth and the fearless faith of German research an
'atonement and consolation for political follies and
'despotic violence.'²

Agreeing, then, fully with the above author on
the importance and even necessity, in Egyptian
history, of 'taking our stand on the Egyptian
'monuments,'—we are attracted to his page 57,
vol. iv., giving the 'limits of the duration of Eryp-
'tian epochs prior to Menes, according to *Egyptian*
'monuments, records, and traditions;' and then
meet with the most confident statement, of a

¹ Bunsen's *Egypt*, vol. iv. p. 378.

² *Ibid.* vol. iv. p. 397.

civilized government having existed in Egypt for six thousand years before the time of Menes, the leading king of Manetho's first, out of his thirty, generally allowed, dynasties.

Upon this assumption or demonstration, wherein the 'monuments' are brought to the head of the facts concerned, Chevalier Bunsen proceeds, at p. 488, vol. iv., to particularize true and real Egyptian history as follows :—

	Date a.c.
* The period of the Nomes, and the formation of Osirism, or * the psychical element of religion, and basis of the union; * provisional solar worship; beginning of Egyptian nation- * ality,	10,000
* Beginning of the formation of castes; priests and warriors; * close of the republican period in the Nomes,	9,086
* Bytis, the Theban priest of Ammon, the first sacerdotal * king,	9,085
* Beginning of elective kings,	7,230
* Beginning of hereditary kings in Lower Egypt,	5,413
* End of them,	3,624
* Contemporaneous Thinite Princes before Menes, during the * last 350 years of the pre-Menite period, according to * Manetho, collaterally with the Memphites, therefore * from 3974 to 3624.	
* Menes king of all Egypt; Orisis-Union, and the conscious- * ness of Egypt being a kingdom,	3,623
* Pyramids built in the first dynasty,	3,460
* Animal-worship introduced, improvement and establish- * ment of writing, beginnings of literature; second and * third dynasty (contemporaneous beginnings of the Ritual),	3,400
* Building of the largest Pyramid (the second of Herodotus),	3,280

The above remarkable chronology closes with a blunder of description, for the 'Great Pyramid,' which is the largest of all the Pyramids of Egypt, is the first, not the second, Pyramid of Herodotus; his second Pyramid being that which he says 'was

'built by Cephren, the brother and successor of Cheops, and which Pyramid he, Herodotus, measured and found to be much less in size than that of Cheops;' in fact it is the Pyramid usually known now as 'the second Pyramid of Jeezeh,' or sometimes more particularly as the 'second largest Pyramid of Jeezeh,' but which expression eventually comes to the same thing. In fact the case was simple enough, until Chevalier Bunsen introduced assumptions of his own about the builders, then proceeded to refer to those assumptions as demonstrated facts, or to found on them as such; and finally to bewilder himself; whence we can only explain amongst other errors his statement¹ that 'the elder' (of the royal brothers Cheops) 'built the second largest Pyramid, and *that vast appendage to it, the stone dyke*;' for no built stone dyke exists far or near about the second largest Pyramid, though there is such a thing eminently in the going down eastwards from the *third* largest Pyramid; but that was long subsequent to the brothers Cheops and their dynasty; and so very much smaller than the second largest Pyramid, as never at any time to compete with it either in name or fame.

Our purpose, however, now, is not to be critically severe with the last item in the above long list of chronicled events in Egyptian history, but to ascertain how all the preceding items have been obtained and settled. That they are considered by Chevalier

¹ Bunsen's *Egypt*, vol. ii. p. 175.

Bunsen as perfectly secure, and beyond the region of doubt, appears from the manner in which he refers to them again and again ; as thus :—

‘ The result of the researches in this present Book
‘ has been, that the traditions *prior to Menes* which
‘ allude to human kings are *real throughout, and*
‘ *exclude entirely heroic fiction and all ideal re-*
‘ *presentations.* We have seen that there was a
‘ series of organic development ; in the first place
‘ we found sacerdotal kings, then elective kings out
‘ of the military families, and lastly kings of an
‘ Upper and kings of a Lower country. Our tables
‘ of the ages of the world show the connexion be-
‘ tween these epochs and the general epochs of the
‘ most ancient national history ; and the parallel
‘ facts we have stated justified us, I think, in call-
‘ ing the Egyptians the chronometers of universal
‘ history, and in asserting that Menes and his empire
‘ are nothing more than the culminating point of
‘ a long preceding constitutional development of
‘ Egyptian life.’

The case therefore grows in importance as it is proceeded with, and its essence consists in this,—that a history of an organized, constitutional, and therefore highly civilized Egypt is asserted to have prevailed for a period of 6700 years prior to the building of the Great Pyramid ; and at the head of the documents, on which this momentous agglomeration of human experiences in this world of troubles, trials, and vexations of spirit is asserted, detailed,

and chronicled, stands the item which all must treat respectfully, '*the monuments of Egypt.*'

With striking propriety is precedence given to 'the monuments' among other remains of early Egyptian history, because the monuments have lasted better than anything else; there are earlier stone monuments, for instance, than papyri, or books, or papers of any kind or degree; and the stone monuments are all vocal with inscribed hieroglyphics; they speak clearly of what was transacting in their time; and are '*the contemporary records,*' which Bunsen alludes to (vol. i. p. 31) 'as the 'earliest and most certain source of all Egyptian 'research.'

Employed just in this manner, and in this only, it is that Egyptian monuments have the marvellous power that has been attributed to them of clearly establishing the events and stories of life in the earlier days of the world. Thus, also, Dr. Lepsius lays down his view of the law under which Egyptian monuments are to be exclusively, or at least are understood to be exclusively employed in historical researches, when quoted therein by modern Egyptologists and hierologists:—

'We set out then from hence, that the beginning 'of the true history and chronology of no ancient 'nation can, to meet the requirements of their day, 'extend much further backwards than the date of 'the oldest contemporary source of knowledge; and 'we have found this opinion confirmed to the dis-

‘ credit of the early histories of the inhabitants of
‘ Europe and Asia. Therein lies the great advantage
‘ possessed by the early history of Egypt over
‘ all other histories, inasmuch as we can draw our
‘ knowledge of it from contemporary sources of so
‘ early a date ; and they, not literary histories merely,
‘ but also coeval monuments, the most correct and
‘ indubitable of all teachers of history. Therefore
‘ it is that the history of Egypt at so very early an
‘ era may be constructed.’

Baron Bunsen's Authorities demanded.

Now, then, after being thus informed and prepared, let us ask, Where are the Egyptian contemporary monuments on which Chevalier Bunsen has constructed these 6700 years of Egyptian history, prior to the epoch, or say to within one hundred or two hundred years, of the epoch, of the Great Pyramid ?

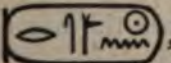
We may ask this question again and again ; and echo will answer, Where ? For there is not a single contemporary monument of the kind known to exist throughout the whole Egyptian land. The millenniums of years have been piled up one over the other by the great word-philosopher of our age without a single monument to refer to. Chevalier Bunsen, moreover, knew that there was not one such monument for appeal or for guidance, because he has written in his first volume, page 69, of

‘these monuments of the fourth dynasty’ (including, therefore, the epoch of the Great Pyramid), ‘*the oldest in the world* ;’ and though he attributes in his second volume some of the Abooseer Pyramids to the third dynasty, Dr. Lepsius claims them for the fourth ; and the difference of years between the two dynasties can in no case be very notable. Extend it even to two hundred years, and ask again—where are all the earlier contemporary monuments on which Chevalier Bunsen constructed the Egyptian history of the 6500 years previous to the dynasty which erected the Great Pyramid, or the Abooseer Pyramids ?

Again comes the answer,—such monuments do not exist ; not a single one, large or small, fixed or portable, belonging to all that enormous interval of time, has ever been seen by modern hierologist or excavator. Dr. Lepsius, the most experienced both of all men now alive and of all who have lived during the last three thousand years touching the more ancient monuments of Egypt, wrote from his excavations at Jeezeh in 1843 :—‘Nor have I yet found a single cartouche that can be safely assigned to a period previous to the fourth dynasty. The builders of the Great Pyramid seem to assert their right to form the commencement of monumental history, even if it be clear that they were not the first builders and monumental writers.’ And again he says, ‘The Pyramid of Cheops, to which the first link of our whole

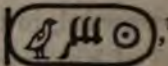
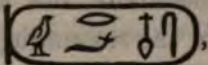
'monumental history is fastened immovably, not only for Egyptian, but for universal history.'¹

Two thousand years only from the Great Pyramid downward, in the stream of time, have covered the land of Egypt from one end to the other with its marvellous piles of chronological monuments,—but of Baron Bunsen's 6500 asserted previous years of highly civilized Egyptian monarchy, not a single monument exists, not even in the resounding pages of the great Prussian diplomat.

The monuments of the third dynasty are the first there directly appealed to as existing; and though in vol. ii. p. 617, the hieroglyphic ovals are printed of kings in the first and second dynasties,—these are not pretended to be derived from contemporary monuments, but are deduced from votive or traditional references on subsequent buildings; in the same way, in fact, as the similar heraldic escutcheons of two of the idol gods of Egypt, Thoth and Hemithei,—which head Chevalier Bunsen's list of real kings,—have been obtained. In a similar manner, we conclude, have been derived most of the escutcheons of twelve reputed kings of the third dynasty; for the only three which are referred to as legibly written anywhere in the contemporary manner, are ,² variously rendered by differ-

¹ Page 21 of Dr. Lepsius' *Letters from Egypt in 1842 and 1845*, edited by Kenneth R. H. Mackenzie. London, 1852.

² Quarry-marks of a ruined Pyramid of Regah and the middle Pyramid of Abooseer.

ent authorities as Seser, User, Ousre, Ousrenre, Ra-en-seser, Raosis, Userra, and Userchre, and placed by Dr. Lepsius in Plate xxxix., vol. iii. of his folio plates, in the fifth dynasty : ¹, variously rendered Re-shore, Shoure, Shura, Sahu-ra, Soris, Sirios, and placed by Lepsius in Plate xxxix. of his volume iii., also in the fifth dynasty ; and lastly, ², pronounced Snfru, Senefru, Chnubos-gnevros, and Sephuris, and placed by Lepsius again and again in the fourth dynasty.

Hence all the earliest monuments known even to Chevalier Bunsen, cluster close about the fourth dynasty, or the builders of the Great Pyramid ; and according to the Great Pyramid itself, mechanically and astronomically interpreted, they belong more or less to the year 2170 B.C. ; which date, and not the year 10,000 B.C., is therefore the earliest date that can be fixed by '*the monuments*,'—used as they only can be safely, properly, or legitimately, for *contemporary events*. Or, in other words, these severe and unexceptionable witnesses, the monuments of Egypt, have shattered in pieces the learned philologist's baseless construction of 6500 years of previous supposed Egyptian history, and over which he had been holding for so many years the name of '*the monuments*' as an ægis of protection.

¹ Northern Pyramid of Abooseer, and a tablet in Wadec Maghara.

² Tombs near the Great Pyramid, and also tablets in Wadec Maghara.

Consequences of there being no Authorities.

Having once been cited on the field, these monuments are indeed active, as well as passive, opponents to those who use them wrongfully; for not only do they *not* bear testimony to an Egyptian monarchy lasting through that immense period of time claimed by Chevalier Bunsen, but their absence shows that such a thing could not have been; for had it existed, material traces innumerable of such a world-long period of civilisation would have been left behind, and in Egypt nothing of that sort decays. 'It is not there,' says Bunsen himself, 'as it would be in Europe or India, where in the former cold and snow, or in the latter heat and rain destroy; for Egypt is the monumental land of the earth, adapted not only for saving its monuments from great dilapidation, *but for preserving them as perfect as the day they were erected.*'

Thus, too, the learned and most competent Dr. Lepsius holds forth,—'Even that apparently most perishable of all building materials, brick of black Nile mud dried in the sun, has retained for thousands of years its architectural junctures, and the cement with which it is united. Around the celebrated temple of Ramses the Great, at Thebes, the "Memnonium," stands a suite of great vaulted halls, altogether built with this material, and partly coated with stucco. These were built at the same time with the temple itself at the commencement

‘ of the thirteenth century B.C. This fact not only
‘ appears from the architecture, but also still more
‘ demonstrably from the bricks themselves, which,
‘ as being made for the king’s service, are stamped
‘ with his name. At that time, and earlier, it was
‘ a very common practice to coat the tombs exca-
‘ vated in the rocks with Nile mud, and to lay upon
‘ that the white ground of stucco for the paintings.
‘ This was especially the case when the rock was
‘ brittle, and required a vaulted roof. The same
‘ custom prevailed even up to the most ancient
‘ times of the Pyramids of Memphis. But not only
‘ the materials, but also the colours which were laid
‘ upon them, retain to this day all their freshness,
‘ without any perceptible change, in closed vaults,
‘ and in certain cases, even when exposed to the
‘ open air.’

Even, therefore, had Egyptian monuments been executed in mud alone, something of the innumerable buildings in that material during 6500 years of the life of a great nation would have come down to us in that peculiar land. But the Egyptian country excels likewise in its abundance of hard materials of the best quality, either for building or carving into *in situ*; such as its admirable limestones, sandstones, porphyry, basalt, and granite; and the Egyptians, of all people who have ever lived on the earth, were the most skilful in working the hardest materials: delighting apparently ever more and more, to employ them either rudely in archi-

ture, or to sculpture them finely, the harder they were. Hence both the hollow sarcophagi and solid statues which they worked out of granite, basalt, and diorite,—are alike, even still, a marvel to all practical men as to how they were executed; and the taste for working in these hard materials was at least as strong, if not stronger, in the earlier than the later dynasties.

These materials were also employed in a manner still further to promote their lasting qualities; for as Dr. Lepsius continues to remark,—‘Next to the abundance and beauty of these works of art, is the extreme care for their permanence which was exhibited by the Egyptians, and which was evidently in accordance with their religious belief. It is scarcely needful to refer, in proof of this, to the two great Pyramids of Jeezeh, which are, in fact, artificial mountains, constructed with huge blocks hewn from the rock on which they stand, and in which sepulchral chambers were afterwards excavated with the chisel, as though they had been natural crags. It is as if the builders of them had designed to erect two pillars to support the vast superstructure of the history of mankind. This is, in a word, the peculiarity of all that remains of the works of the ancient Egyptians. Whether they built halls for pomps and festivities, or dug out sepulchral chambers; whether they constructed for life or for death, it was always with the intention that their works should last for ever.’

Hence the proper conclusion will surely appear in the eyes of common sense,—that, if such *lasting* monuments formed the permanent and abiding character of the Egyptian nation, and we find no monuments of it whatever, anterior to the epoch of the reputed, and by moderns so-called, fourth dynasty,—the nation itself did not exist anterior to that epoch, and certainly not through the 6500 years of Baron Bunsen's assumed pre-Pyramid history.

Origin of the Egyptians.

There remains indeed the difficulty of accounting as to how the Egyptian monuments make so grand an appearance as they do, the moment they come upon the scene at all; for the sculptures of the fourth dynasty are not only in as true and fine art as any, but even better than most, of those which followed them; and it is contrary to all experience that a people could spring in a moment from absolute nothingness to such admirable perfection.

The difficulty is indeed a serious one, but not relieved in the slightest degree by going back to Chevalier Bunsen's vision of an early Egypt with both an Upper and a Lower crown, and a city of Thebes founded long before Menes or any of the Pyramids; for the tedious and enduring ages of imperfect beginnings and defective executions should then be findable. And here, at this point and view of the case, the truth of which he also would seem fully to allow, even the acute M. Renan is reduced

to something like wonder, confusion, and despair; 'for when one thinks,' writes he, in discussing the Great Pyramid, Sphinx, and similar well-known monuments, 'when one thinks of this civilisation, 'at least 6500¹ (really 4035) years old from the 'present day, that it has had no known infancy; 'that this art, of which there remain innumerable 'monuments, had no archaic epoch; that the Egypt 'of Cheops and of Chephren is superior in a sense 'to all that followed,—one is seized with giddiness; *on est pris de vertige*.'

This confession is frank, and does M. Renan notable honour; for the facts before him do seem, as he further on confesses, to imply, that all the ordinary understood laws of the beginning and growth of a nation 'have been totally reversed in the case of 'Egypt.' One ray of light in the way of a possible line of explanation, does indeed occur to him, but he does not seem to follow it up; and he does not appear aware that it had occurred some years before to another author, viz., William Osburn; and had been abundantly probed, tested, and investigated by him, even to the extent of showing that the people who afterwards formed the Egyptian nation arrived at the banks of the Nile, near the crown of the

¹ This 6500 years ago, or 4635 B.C., is M. Renan's date for the fourth dynasty; and does not therefore point to anything, relative to Egyptian history, earlier than our statement of 4035 years ago, or 2170 B.C. would do. He is therefore alluding really, under his larger figure, to the same absolute time, monuments, and personages, that we do under the smaller numbers given by the Great Pyramid itself.

Delta, as colonists from another land, only a very short time previous to the epoch of the fourth dynasty.

As colonists from another land, and under very remarkable circumstances: what these were, W. Osburn goes into deeply, in a critical examination of the foundations in nature of the hieroglyphic forms; deducing thence something in the first settlers of Egypt 'as to a company of persons once in 'a state of high civilisation, but that through some 'strange anomaly in the history of man, they had 'been deprived of great part of the language, and 'the entire written system, which had formerly been 'the means and vehicle of their civilisation.' Combining which inference with the indications he obtains otherwise, that 'the Fathers of ancient 'Egypt first journeyed thither across the Isthmus 'of Suez, and that they brought with them the 'worship of the setting sun,'—'how is it possible,' he adds, 'to resist the conclusion that they came 'thither from the plains of Babel, at the first dispersion of mankind, and that the civilisation 'of Egypt was derived from the banks of the 'Euphrates?'

And after still further investigations, he speaks more confidently of 'the cares, the fears, the designs of the leaders under whose standards the 'Mizraites first marched westward, before the mysterious impulse that drove them forth from the 'fertile plains of the Euphrates. They fled before

'it, nor dared to tarry on the grassy banks of
'Jordan, nor in the shady valleys of Judah, nor
'by the waters of Siloah, that flow softly. The
'voice of a greater than man sounded in their ears.
'The terror of an invincible power awed their
'spirits, and they dared not disobey. They braved
'the perils and privations of a journey over an un-
'known desert, before the same fearful impulse ;
'nor ever were they allowed to rest, until they had
'reached the uttermost borders of the land which
'He who pursued after them had destined them to
'populate.'

Respecting this theory, we can only say at present, that in so far as it offers a beginning for Egyptian history, it accords with '*the monuments of Egypt*,' those unaltering, unaltered, and unavoidable indices and accompaniments of every such investigation. But if these same monuments do not also, as evidently they cannot in themselves, enable us to trace back to events much earlier than their *own* times,—all-exciting as it would be to the soul of man, were he really able to look into the events of these truly primeval periods of the human race,—we shall do well to endeavour, simply and soberly, to ascertain by the light of their guidance through later times, what was the further course of this remarkable nation *after* its apparently forced, and certainly very sudden, monumental beginning on the banks of the Nile.

CHAPTER V.

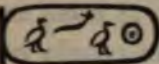
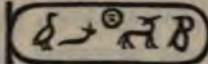
LIFE UNDER THE OLD EMPIRE.

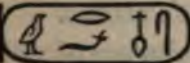
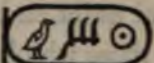
THE earliest identifiable contemporary monuments of Egypt, or the beginnings of its monumental history, so far as known to European researches up to the present year, are, according to the unanimous opinion of all hierologists,—the rock-tablets of Wadee Maghara in the peninsula of Sinai ; and the Pyramids, with their surrounding tombs, at Jeezeh, Sakkara, and the Memphis neighbourhood. And this conclusion equally obtains, whether these remains be considered to belong to the fourth dynasty only, or partly to the third, and partly to the fifth.

Equally is it also the fact, that these earliest examples of the monuments are confined to the places mentioned ; and that Middle and Upper Egypt, and still less Nubia and Ethiopia, have nothing whatever to compare with them in antiquity. So that the general testimony of the monuments in Egypt itself, is precisely as Lepsius and Osburn have demonstrated ; viz., that that species of testimony to the civilisation of Egypt began, and

began suddenly, near the upper corner of the Delta, and *ascended*, as it grew with ages, the valley of the Nile; illustrating thereby its Asiatic, not African, origin.

The Sinaitic remains of these earlier dynasties are not many, but are remarkably well sculptured; are claimed by all hierologists to be authentic and contemporary; belong chiefly to the kings

 Shofo,  Nu-Shofo,

 Sephuris, and  Soris;

show—by their designs—that animal-worship, or animal and semi-animal gods, were already established and revered; and that there was armed opposition to the Egyptians from the natives of that peninsula, emphatically represented as thrice hilly; and which we now are aware contains noble pinnacles of mountains upwards of seven thousand feet high,—natural watch-towers overtopping and overlooking everything else in Egypt, Libya, and Arabia for leagues and leagues around them.

The Jeczeh and Sakkara remains, on the contrary, besides being vastly more plentiful, are eminently *peaceful* in their traits. In the case of the Pyramids, indeed,—those closed and artificial mountains of stone say nothing whatever, either by picture or inscription, for one cause or the other; while in form and fact they merely supply the otherwise flat-topped landscape with acute hill-points, and without offer-

ing anything approaching to strongholds for war, or gathering-halls for peace.

But when we enter the tombs, there pictured scenes are witnessed on every side, of agriculture, cattle-feeding, industrious country life, and with hardly anything else. These characteristics, moreover, are continued, often through the lives of two, three, and even more generations of the same family; indicating that, there, or then at least, and however it was procured, the Egyptian people had rest and quiet and freedom from war's alarms.

For those who have not had the privilege of visiting these earliest pictorial monuments of Mizraim, and for many of those who have too,—their chief trust for what is there contained must be placed, and will be most worthily placed, in Dr. Lepsius' large work of twelve folio volumes;—the largest collection of Egyptian plates, out of the many large collections brought out by different European countries, that has ever yet been produced; and the first that has been *chronologically* arranged. This is a unique feature, and one which, to have its requirements properly executed, perhaps needed a Richard Lepsius to pave the way; but having once been executed, and by him, some extension of grasp of the great Egyptian subject must occur to every one, on each successive occasion of looking over the series of carefully-executed engravings.

Volume first, after several maps, begins a long series of topographical views extending through

both this and the next volume, and arranged apparently with strict attention to the date of the earliest monuments discovered at each place ; the names of such places being then found to run in the following order :—

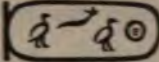
Sinai, . Wadec Feran.
 Wadec Maghara.
 Sarbut el Kadem.
 Memphis, Abou Roash.
 Jeezeh.
 Abooseer.
 Sakkara.
 Dashoor.
 Lisht, . Meidun, Illahun.
 The Faioum.
 Sais, . Heliopolis, Tanis.
 Benihassan.
 El Amarna.
 This and Abydos.
 Thebes, Luxor, Karnak.
 Esneh, Elilithya, Silsilis.
 Philæ.
 Abusimbel.
 Soleb, Barkal.
 Meroe, Sofra, Naga, etc.

Any good map will show the generally increasing southern distance of each of these localities successively ; but only the Plates themselves will give a good idea of how, after the last rays of their meridian splendour at Thebes, the monuments further south become continually poorer, smaller, and even more decayed though more modern, especially at the last-named station in Ethiopia.

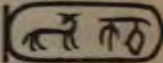
But the next volume, or volume iii., begins the

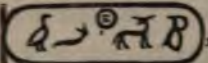
real burden of Dr. Lepsius' great task, viz., the inscriptions on, and views of, the monuments themselves. And how do they begin in his chronologically arranged work?

Plate I., entitled fourth dynasty, contains first, a large-sized reproduction of the quarry-mark of

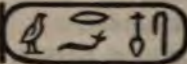
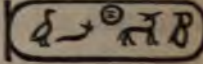
 Shofu, from Howard Vyse's chambers

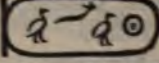
of construction in the Great Pyramid; second,

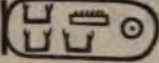
smaller copies of the quarry-marks of 

and , or Nu and Nu-Shofu from the

same place; and, third, some indistinct markings from a Dashoor Pyramid. Plate II., also entitled fourth dynasty, gives three tablets from Wadec Maghara, to

 Sefhuris, 

Nu-Shofu, and  Shofu; Howard Vyse's coffin-lid out of the third Pyramid with the oval of

 Mencheres, and a door-ornament from

Sakkara, now in the Berlin Museum. Then follow five plates of pictures and inscriptions inside tombs at Abooseer, and thirty-two plates of similar subjects from tombs about the Jeezeh Pyramids, all *entitled* of the fourth dynasty. These being followed by forty-four plates entitled of dynasty fifth, of which one is due to Wadec Maghara, sixteen to Sakkara, and twenty-seven to Jeezeh.

Volume fourth represents further subjects of

dynasties fourth and fifth, in twenty-three plates, from tombs at Jeezeh and Sakkara ; then dynasty sixth, in thirteen plates, at Sauiet el Meitin, Hama-mat, Chenoboskion, etc. ; and then follow in this and the next volume dynasties eleventh, twelfth, and thirteenth, from a greatly increased variety of places, and with many new subjects.

Men of the Fourth Dynasty.

Before studying, therefore, these later periods, let us cast a glance on the men of the fourth and fifth dynasties, or those who were contemporary with the building of the Great Pyramid.

On entering every tomb, we have these men before us immediately ; reddish-brown men, with long, and either straight or slightly aquiline curved noses, large and long eyes, and rather full lips. Their foreheads are probably low, certainly not notably high, but the rest of the cranium is a phrenological mystery, so completely is it hid in a thick, fuzzy, close-cropped, black, wig.

The wig was a great institution in ancient Egypt, and dyed jet black, so that even with the most aged men,—and whose age is shown both by their leaning on a staff, and having their poor naked breasts, and whole torso seamed with deep, ungainly, transverse wrinkles,—the blackness of the wig remains unimpaired. Other clothing is not very abundant. The princes issue forth to overlook their labourers with an awful baton of authority and chastisement in their

hands, but attired only in a short kilt—usually of white cloth—skate-like sandals, a blue and white necklace, and the wig ; on a few occasions a leopard's skin is worn over the shoulder. The overseers next in authority under them, and the succeeding grades of scribes and field-labourers, have only a piece of cloth about the waist, and not always that ; no sandals, seldom a necklace, but always a wig.

The women's wigs are larger than the men's, and arranged so as to be typical of long straight-flowing tresses, though rigorously confined to a definite length. The complexion of their skin is a yellowish pale olive ; and the costume,—varied only in the case of princesses over servants by necklaces, bracelets, and anklets of blue and white glass beads,—consists of one long, close-fitting and enclosing garment of thin elastic material, like a guernsey jacket ; but extending from the ankles, upwards, to close under the breasts, whence two broad straps pass over the shoulders to support it. This envelope is brilliant scarlet in colour, has never a fold or wrinkle in all its length or breadth, and yet appears abundantly to allow of the separation of the feet in walking or dancing.

Throughout the whole of the pictured scenes, there is not a single instance of a peasant enjoying, or working for, himself under his own vine and his own fig-tree ; no independent thought, or look, or action, on the part of poor men is allowed, but they are all in official training to serve the Prince of the

time being ; and *administration* is the order of the day. The difference of dress described between prince and peasant, is an involuntary method to the artist of distinguishing rank ; but his intended method is there also, viz., superior size or scale. Hence, the owner of the tomb is a colossus standing the whole height of the wall ; which, in front of him is divided into six, eight, or more compartments, by horizontal lines, on the edge of each of which his servants are engaged on their various services.

Ploughing—and sowing too, in so far as concerns covering up the seed thrown broadcast by hand,—seem both accomplished by driving flocks of sheep and goats over the lately inundated land ; reaping is performed with a sickle ; thrashing by driving herds of donkeys about a floor ; and winnowing with spades. But the agricultural operations are very scanty, compared to the pastoral. The sheep, indeed, long-legged things, with horizontal and mutually diverging horns,¹ and the goats with venerable beards and lyre-shaped retreating horns, are not very numerous,—but the oxen and greater cattle are in exceeding abundance, of magnificent quality, and of a portliness which shows them rather intended

¹ We say sheep advisedly, although M. Renan writes there are no sheep. His account is otherwise good,—but for these very early ages only of Egypt, be it understood,—and stands thus : 'Amongst the number of domestic animals possessed by the deceased were, oxen, donkeys, dogs, apes, antelopes, gazelles, geese, "*demoiselles de Numidie*," ducks, tame storks, and pigeons ; but one never sees there either horses, camels, giraffes, elephants, sheep (?), cats (?), or fowls.' —P. 669, *Revue des Deux Mondes*, April, 1865.

for the butcher than the farmer ; their horns are long, tall, and branching, and they, the animals, move about with a pompous sedateness possible only to enormous fat beasts, but with a regularity and order forming an instructive contrast to the donkeys which,—with how many men soever to beat them into shape, have their heads diverging to all points of the compass ; and some of the group always giving tongue with might and main.

Not a little remarkable also is it to see the many wild animals, tamed apparently, or undergoing a tentative process to that end ; there are in this condition the small gazelle, and some larger antelopes of the size of a half-grown heifer ; here with long straight, and there with exceeding curved, horns. Sometimes whole rows of these beautiful and powerful animals, with collars round their necks, are brought up for the great man to inspect ; or for his scribes, with one pen behind their ears and another in their ready hands, to enter into the roll-list of his property.

The hyæna is likewise often seen, and very tame ; for though he is led along by a string attached to a collar round his neck, the boy holding the string with one hand, is supporting something like a basket of crockery on his head with the other ; and while the collar does not fit tightly round the hyæna's neck, that neck is so thick and the head so small, that the animal could easily free himself, if he chose. But he does not choose, and occasionally may be seen

quite unshackled ; while a boy behind tries, by rubbing the end of his tail between his palms, to urge the—in these days most ill-tempered—beast, to attack some object in front, in which direction too, he is evidently pricking forward his ears.

And this hyæna is always a large one, drawn with admirable skill and knowledge of wherein the strength and better qualities, or rather efficiency, of a hyæna lie. There is no uncertainty with the artist, no rubbing out of lines, no confusing the anatomical form with hair ; but you see a hyæna walking forth as nature originally made him, clean-limbed and powerful, adapted either for speed or strength ; neither over young nor over old ; over fat or over thin ; but just as the Great Creator had intended him to be in the plenitude of his life and powers.

Social relations.

Similar close observation of nature, combined with artistic skill, is shown in the representation of the birds innumerable, inhabiting the thickets of reeds bordering the Nile (or that once bordered it, for they have lamentably decreased since then, and all parts of the Nile which we chanced to strike on, in our own short experience of it, exhibited only clay banks). The consternation, too, amongst the said birds, when the prince approaches in his papyrus raft to smite them ; or when his servitors spread large clap-nets for them ; and the similar confusion amongst the fishes when they are likewise netted,—all this is rendered

admirably true to life, and full of motion and purpose.

Yet even in these sporting scenes, despotic power is painfully manifest. There is a prince or two here and there, and all the rest of the people are working under or for him ; well looked after, but ignobly treated ; no labour-saving instruments are allowed, not even a handle to a hammer-head ; the wretched slave must make up for want of that mechanical appliance which would cost his lord money, by an extra exertion of his own muscles. Excellent patterns they had to work up to ; their chairs for instance being models of mechanical lightness and strength ; the two hind-legs curved like the hind-legs of some animals, and the two front ones like the fore-legs,—fastened on to the seat by a mortised joint, with an extraordinary length of bearing to give firmness,—and yet so introduced into the artistic expression, as not to take away from the light-some look of the whole ; but hardly any tools are seen about, and the polishing is executed with little stones held in the hand, or with the fingers themselves and polishing-powder. The human material appears to be held at the cheapest possible rate, and to be used up for everything. The taskmasters, too, are always present, and the people kept in excellent order by the same method that Chinese boatmen are said to manage their ducks ; viz., the duck which comes home not slowly, or absolutely late, but relatively last, is killed ; or the man whose work makes least show at the close of the day, is laid

down on the ground, and bastinadoed by his fellow-slaves acting under orders.

On stated occasions come *feasts*, for there are some respites to all slaves; but in ancient Egypt they were not 'Saturnalia,' for the *balance of law and order* must never be interfered with there. So when this prince has been satisfied with the *examination of his property-rolls*, he seats himself like a god before a *dinner-table*; which is thereupon *piled up with stores of bread*, and on the bread *meat, geese, joints of meat*, etc. etc., are accumulated, while *rows of oxen* are turned heels over head, and *slaughtered before him* in the most approved manner; ultimately, *no doubt* for the mass of the people; but the joints must first be carried to the prince, as if for his use only.

Nothing, too, can be done in these establishments on a small scale; when milk is required, a whole tier, or perhaps two or three tiers, in the mural painting, of cows are being milked at once by as many well-trained, experienced milking-men; and rows upon rows of both men and women servants come laden with provisions to the mighty presence, and servilely attend its nod. No idleness was there in the land of Egypt during the fourth dynasty; something was found for every one to do; and not even a cripple was safe from daily toil of some kind or another; such objects being seen at work in the pictures, and having frequently the heartless and hopeless inscription over them, 'Slaves born in the house, (registered) in the books of the house for ever.'

This was the more public life, and in private it was just as unlovely. The father was a ruling despot in his family ; the wife, indeed, may by grace come up behind, and put her hand from a distance on his shoulder,—but the children are diminutive creatures, reminding one of mice more than human beings, and are low down on the ground below the level of the parents' knees. What they think or feel seems to matter little indeed to the lord their father ; who is ever looking straight before him to the administration alone of the affairs of his many estates.

Many estates, for sometimes ten or fifteen are expressly mentioned in the hieroglyphics ; each with a name and usually a notice describing by, or under, which king the included land had been reclaimed from the desert. This is an important element in the history of the times ; indicating strongly that Egypt was then a new country, with its kings, nobles, peasants, and all its inhabitants strenuously engaged in rendering the ground amenable to culture and suitable to raising food for man.

Reported Engineering of Nile Banks.

We are thereby, too, brought into contact with the tradition related by Herodotus, that Menes, the first king of Manetho's first dynasty (the king therefore with whom almost every writer begins the acknowledged history of Egypt,—though there is not a scrap or a vestige of any *contemporary* monument, belonging either to him or any of his reported successors

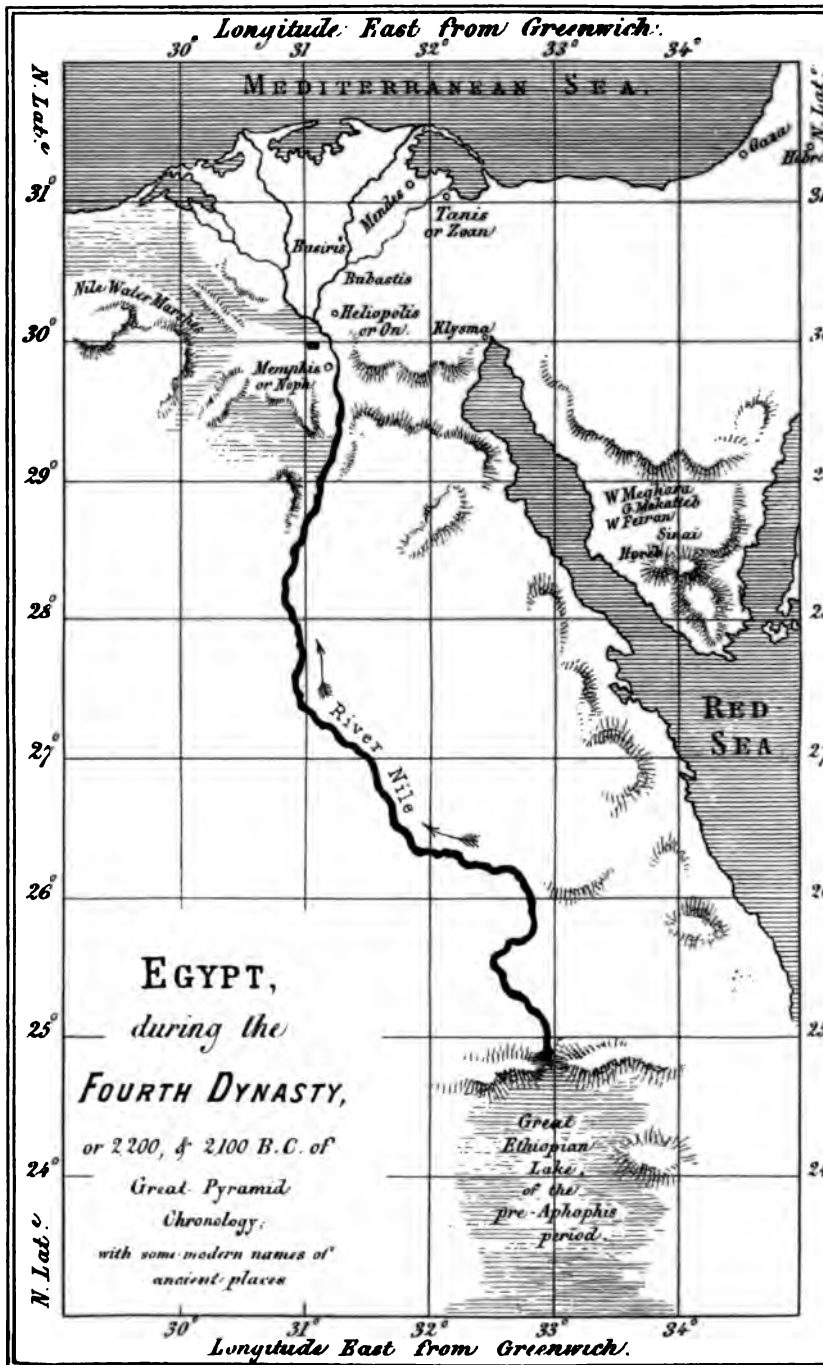
for many generations, still existing),—that this king Menes was the first to cross over from the eastern to the western bank of the Nile ; and there to found the city of Memphis, after executing certain important hydraulic works, whose nature has been much disputed. Menes met the Nile, near the subsequent site of Memphis, flowing along on the western side of the Egyptian valley close under the Libyan mountains, says Bunsen, with some assistance from Wilkinson ; wherefore he, Menes, executed certain considerable works at a place now called Kafr-e-Zyat, some miles above Memphis,—and thereby turned the river into a new channel cut along the centre of the valley, and then obtained the ‘*beautiful lowland*’ of the former side-channel, *which was so well adapted for the site of a great metropolis.*’

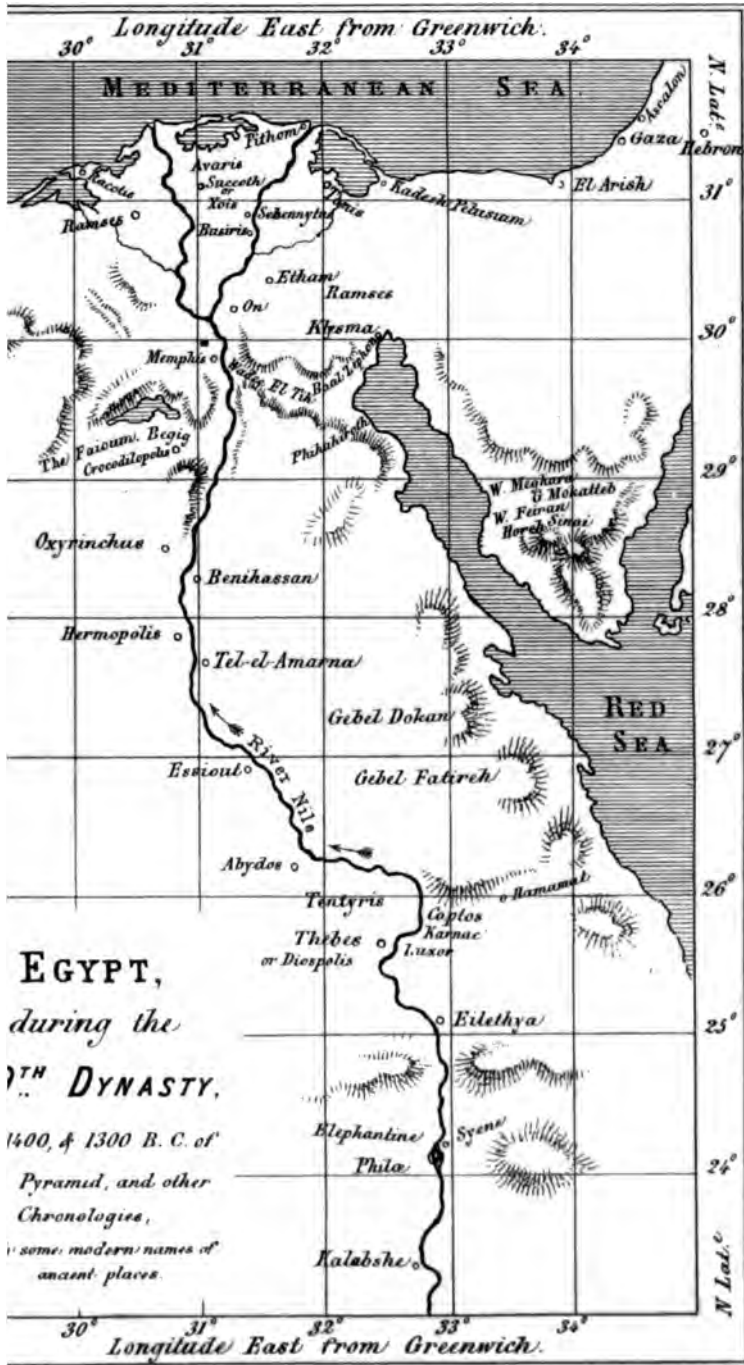
With all respect for Chevalier Bunsen, we cannot see the sense of the object thus described ; for there was no gain of increased extent to the cultivateable land of the Egyptian valley, but merely a change of the stream’s place therein. And we doubt whether the locality of the river’s late bed, ‘*beautiful lowland*’ though it be called by a closet-philosopher, could have been well adapted for founding a city in,—unless the chief object were to expose the inhabitants to the imminent peril of drowning at every annual inundation ; especially as we see now that towns and villages in Egypt are by preference built on *elevated* ground. There was a theory too, first started by M. Andreossy and the French *savants* of

1799, to the effect that the Nile flowed anciently westward to the sea from, or behind, the Pyramid mountains to Bah-bela-ma (stream without water) and the Natron lakes; these being notable depressions still observable in the Libyan desert; and that Menes prevented this divergence of the water. But Chevalier Bunsen treats the statement as a speculation merely, and as referring to something geological, mythological, and absurd; whereas his own version is 'a historical work of a historical king.'

Again, however, we must differ, as indeed Mr. Osburn has also done before us, from the eminent philological critic. His asserted historical work has no contemporary monument to confirm, and has common sense against it. While, on the other side, there are the natural facts, that the long valley of the Natron lakes is, according to Sir Gardner Wilkinson, more than fifty feet *below* the level of the Nile-bank on their latitude parallel;¹ and though nearly thirty miles therefrom in a direct line, yet experiences an annual rise and fall of the water in these lakes, dependent apparently upon the infiltration of the Nile inundation through the strata of the intervening hills,—a slow process, occupying three months of time, or causing the lakes to be that length of time behind the river. (See Plate XI.)

¹ 'According to a rough observation, I calculate the bank of the Nile at Teranek to be about fifty-eight feet above the valley of Zakeek, or eighty-six feet above the surface of the Natron lakes.'—Sir Gardner Wilkinson, *Murray's Handbook for Egypt*, p. 226. London, 1858.





Some of the Nile water, then, even yet escapes towards the westward; and vastly more would do so, and go to waste, if there were any direct opening through the river's western bank, as far as these undoubtedly low tracts of the Libyan desert. If there ever was such an opening, the sooner the first colonists got it closed up the better, and preserved the precious water for irrigating the Delta. Such a work *may* have been executed, and would now be buried hill-deep under the drifted sand of the desert, but we cannot be certain of it. Neither is there any absolute necessity to suppose, that there ever was a plain mechanical hole in the western bank, to be simply filled up; for quite enough cause would it be, for a westward extravasation of the water, that the river should flow for some distance, as described in the tradition, along 'close under the Libyan mountains.' Because, seeing that they are composed of limestone with a large proportion of *salt*, nothing is more probable than that the water would work its way through them in course of time to the deeper hollow beyond. In fact, that would be the case still, did not the river now pass along the middle of the valley, and 'puddle,' or render nearly waterproof, its own bed by its successive yearly deposits of plastic pot-clay, which is the real characteristic of the much-vaunted fertilizing mud of the Nile. (See vol. i. p. 46.)

Now, then, we may appreciate the object of Menes, or any other early king-colonist, in removing

the flow of the river from the very hygrometric border of the salt-engrained Libyan desert, into the middle of the retentive clay valley leading on towards the flat and sweet land of the Delta; and there can be no doubt at all, that before his time, or that referred to by tradition, both the Delta was less watered than it is now, and the Natron lakes and Bah-bela-ma much more so. In fact, they must have been extensive, and perhaps pestilential, swamps,—over whose waters the sun, as seen from the Memphian hills, daily went down to his rest; and on the borders of which the white egrets stood pensively silent, giving rise amongst inventive minds to the notion of their being the souls of the dead, waiting in that submissive shape for the sacred boat to convey them to the same western and lower land to which the sun had just descended before them.

Almost in any way we may thus see, that an enormous engineering work of immediate practical utility, and even pressing necessity,—occupied the first energies of the Egyptian colonists; and the tombs tell the praises of every subsequent king who by his dykes, ditches, and other appliances brought more and more of the present land of Egypt under the control of cultivation. But the moment that the ending of the first great occupation had freed the labour of the mass of the community, and while the subsequent small improvements were still going on,—the building of the Pyramids began; those strange and still incomprehensible monuments.

Of the Pyramids and their Kings.

Strange and incomprehensible, in spite of all the explanations yet given by hierologists; for, allow them to have been built, agreeably to Lepsius, Bunsen, Osburn, and any other hierologist whatever, for kings' tombs,—and allow even to Chevalier Bunsen in particular, that 'no rational being ought ever 'to have entertained the slightest doubt upon that 'head,'—still why were they, as tombs, constructed long before the day of burial, of that peculiar shape; why so very large and solid; and why so entirely undecorated,—when the idea of noble entombment carried on by the princes and people round about the precincts of any Pyramid at the very time of its building, went so entirely towards superabundance of ornament, and making 'a good house'?

These questions have never been answered with a successful interpretation of practical details by any hierologist; and we can only remind, towards their possible future clearing up, that the origin of the Pyramids is to be looked for in the very beginning of the Egyptian nation; not only because the largest, best, and purest, or the Great Pyramid of Jeezeh, is almost, if not absolutely, the earliest of them all; but because the idea died out both as to the pyramidal form and simplicity of internal architecture of a king's tomb, before the Egyptian monarchy had run through one-third of its course.

Even in the time of King Mencheres,



(placed by Lepsius in dynasty fourth, after Nu-Shofu, but with more probability by Osburn in dynasty fifth), great size was no longer thought necessary to a Pyramid, the attraction of colour having then become the chief point outside ; while inside, the sarcophagus shone a perfect marvel of ornamental carving. After his, Mencheres', day again, pyramids were built smaller still, until at last abandoned altogether ; the apprehended necessity for the use, or appreciation of the virtue, of their peculiar form having gradually died away completely out of men's minds.

Wherein then lay the need for building the Great Pyramid so tall, so broad, so heavy, so firm, even as a mountain ? We are entirely unaware of any attempt at a hierological solution of this question, save the suggestion of W. Osburn,—that 'Shofu 'and his subjects may have been haunted with the 'recollections of another great tower, which had 'exercised an important function on the destinies 'of the whole human race ; that thence the idea 'originated in the mind of Shofu, and thence came 'the motives which awed his subjects into submission to his tyranny.'

We do not intend now to consider any of the peculiar proportions, chiefly of originally hidden features, by which the Great Pyramid differed from other pyramids,—but only those more external appearances which it had in common with them. Similarly too of King Shofu, we shall now discuss only what characteristics he possessed in common with

other kings of his race ; and in this broad view have to consider a fact, which Mr. Osburn brings to light from the hieroglyphics ; viz., that some, not all, of the ancient kings were worshipped as gods after their death,—many and many a private man announcing himself to be ‘priest to King Shofu’ in the Great, or ‘to King Shafre’ in the second, Pyramid ; the worship being conducted outside either Pyramid, but directed towards the late king as though he were tenanted the interior as God.

Now, as Mr. Osburn has well remarked, ‘the first settler in Egypt, notwithstanding his accomplishments,—a proficient in architecture, masonry, and sculpture, with the skill to plan, the courage to undertake, and the perseverance to accomplish, the mightiest works of engineering,—was yet a slave to the fear of the supernatural. This impression, call it religion or superstition (the name is unimportant), assuredly was upon his spirit, and he grovelled in the dust beneath it. In his abject slavish terror of the gods, he fenced in what he conceived to be their privileges with stringent and rigid laws.’ In subsequent times these reservations extended, indeed, to many puerilities ; but in the earlier days, as Strabo duly records, there were temples in Egypt erected to God, without pictures and without images in them,—in accordance apparently to an impression strong in primitive man, as to the sin of endeavouring to materially represent the unrepresentable Deity. And when one of these

temples was uncovered recently, viz., King Shafre's, near the Sphinx, behold it built without ornament, having smooth square pillars, square beams, and flat walls, but no carving and no painting.

Hence the undecorated interior of the ancient Pyramids we may regard as consequent on the deification of the king there entombed.¹ All the *earlier* gods of Egypt too, maintains W. Osburn, were dead men; Osiris was Mizraim, the chief of the clan who marched westward from Babel, carrying with them as a tradition the worship of the setting sun. Mizraim reached the banks of the Nile, founded the city afterwards called Heliopolis, and finally died, and was deified at Busiris in the Delta. His name signifies 'two cities or strong-holds;' and was adopted as a special designation for his descendants, as soon as either Menes, or *some* predecessor of Shofa, crossed the Nile and founded a new city on the western bank, in opposition to the older one on the eastern side of the river. This distinction went on continually growing,—as one city pushed its improvements upwards into the longitudinal valley, and the other downwards across the broad Delta,—until it ripened into the historic opposition of Upper and Lower Egypt, with their two distinct crowns, and hieroglyphic royal ovals always written in duplicate.

¹ 'The Great Pyramid with its precinct, was dedicated to the worship of Shofa after his burial. It is repeatedly named "*the great temple of Shofa*."'—W. Osburn's *Egypt*, vol. i. p. 278.

Every succeeding Memphite king to Shofu, seemed to press further and further up the Nile, and build a new city in the richer alluvial there to be found. Such city was then forthwith presented with a severed limb of the deceased Egyptian patriarch Mizraim, dismembered for the purpose at Busiris ; and it also provided itself with a local god, whose continual presence was assured for the protection of the citizens, through adoption of the gross symbolism of a living animal. The celebrated royal proclamation said by Manetho to have been issued in the second dynasty, assigning *the bull Apis to Memphis, the bull Menevis to Heliopolis, and a goat to the city of Mendes*, being only a small beginning of the dreadful religious leprosy which afterwards spread over the whole land.

To Mencheres, however, is attributed by Mr. Osburn the foresight to perceive, soon after he had founded the city of Abydos, that this completely free trade in the raising up of gods, was leading to a rapid disintegration of interests amongst the now numerous cities of Egypt ; wherefore, he both elevated the priests into a peculiar institution, and set on foot efforts to make Mizraim or Osiris the god of all Egypt. Hence, as a beginning, he proceeded to gather up the severed limbs of the patriarch from every city to which they had been distributed. But from this arose,—for each city tried stoutly to keep its own relic of their common progenitor,—a long series of internecine wars,

which have caused the dynasties from the sixth, to the eleventh, to be without names in Manetho, and without monuments in Egypt. The Mencherian faction, however, conquered at length; the priesthood became powerful, dominated in the temples, wrote the only permitted history of the country, denounced their late opponents, and praised up Mencheres far above any other sovereign, either before or since his time.

The details of all these points, and their explanation of the priestly inventions of the fable of Osiris and Typhon, Isis and Osiris, and their son Horus (who was Mencheres himself, after he, Mencheres, had manufactured Isis by splitting the figure of Osiris in two, and then declaring that the chief god of Egypt was married), these things, we say, should rather be studied in W. Osburn and other special writers. Here, we have only to deal with the general result; or that, with whatever number of gods the early Egyptians supplied themselves, they were never at ease. Not indeed that they were grieved at, or troubled with, the thought of being sinners,—for they were on the contrary for ever declaring themselves to be perfectly ‘pure,’ and free from every kind of sin, the least as well as the greatest; but they seemed to fancy themselves tyrannized over by a supreme Deity, and therefore turned round, and in their boasted purity of both heart and soul, tyrannized in turn over their fellow-men,—until Egypt ‘became then, what it has

'always been since, the house of bondage to the
'human race.'

Conclusion of the Old Empire.

Towards the end of the eleventh dynasty, with which Manetho terminates his first volume, and in the time of Kings Acthoes and Amenemes, Egypt was visited by the patriarch Abraham; and, if we may trust Josephus, expressly to commune with the priests in a friendly spirit on their unhappy religious beliefs. The Bible indeed gives no such particulars, but does not say anything against them, while it indicates that Abraham *was* in the country a long time, sufficiently long too for such a purpose. Nevertheless we presume that little faith is to be placed in Josephus's account, unless confirmed by the monuments. Something however of that sort appears really to be the case; for the sacred patriarch is likewise said in the same passage 'to have taught the Egyptians arithmetic, and to have communicated to them the science of astronomy as it had then lately been built up in Chaldæa.' In accordance with which, Mr. Osburn finds ever after that date, what he never met in times before, viz., the year of the king's reign always introduced in hieroglyphics. He believes too, that that method was induced in great part from the exactness with which the Chaldæan astronomy, imported into Egypt by Abraham, showed the true length of the year as measured in days easily counted.

Hence, no doubt, the simplification of the Egyptian calendar; for from King Shofu of the fourth dynasty, or even from King Menes, if ever there was such an individual, down to King Acthoes of the eleventh dynasty, the Egyptian reckoning of time is said to have been almost entirely *lunar*, and based on two traditions brought with them by the Mizraites, on first colonizing the Nile valley. The first tradition being to the effect that twelve lunar months proximately made a year; and the second, that the moon immediately after Sirius had been seen to rise cosmically, ought to be held the first moon in the year; whence sometimes thirteen lunar months in their calendar year. Each year further began with a full moon; from which phase to the crescent of the old moon, ten days; then from that to the crescent of the new moon, ten days; and from that to full moon again, ten days nearly, making up three of the old Egyptian decadal weeks of ten days each.

Thus have we followed the stream of Egyptian life, by its contemporaneous monumental traces, from its earliest known remains in the fourth dynasty down to the eleventh; or from the year of 2170 B.C. (perhaps 2200 B.C.) to 1959 B.C., according to the dates of the Great Pyramid and W. Osburn; and have thereby reached the world-known name of the patriarch Abraham,—but have touched, as yet, on no independently settled and generally received chronology, and nothing that can be called history. We are still indeed in a manner high above the strata

of clouds which keep the solid material earth of true historical times from our view ; we are still in primal ages, whereof the only human contemporary chronicles are the Egyptian ; and those, imperfect, and very variously interpreted by different modern authorities. Wherefore, though we have with little doubt passed through the age of the chief Pyramid-builders,—it is incumbent on us to pursue the course of their successors still further down the stream of time,—until we have connected them with general documentary history ; or seen them arrived amongst events which all nations acknowledge, and upon times where no schools of chronologists have any sensible differences.

CHAPTER VI.

LIFE UNDER THE NEW EMPIRE.

ALTHOUGH several modern authors of repute include in their systems the twelfth Egyptian dynasty, as forming part of 'the old Empire,' whose limits they have concluded upon rather arbitrarily,—we may do better, with William Osburn, in attending to the broad line of separation which Manetho himself established between the eleventh and twelfth dynasties, or the distinction between his first and second books. Especially, too, may we do so, when that line is confirmed in a substantive manner by the monuments.

These authentic testimonies, without doubt, speak of an unusually prosperous period for the twelfth dynasty, testifying to union, numbers, and wealth such as had never before been seen ; and the occurrence of which is looked on by the author of the *Monumental History of Egypt*, as the legitimate and to-be-expected result of the conclusion of the long series of Mencherian wars,—terminated as they had at last been by the positive triumph of one party, and its complete domination over all who had once offended them.

Neither was it a mere continuation or even augmentation of the scale of their former life which Egyptians now experienced ; for partly owing to increased wealth, and partly to the more complete establishment of the priesthood,—a certain amount of slow change in kind or quality did also take place amongst this people. And it told by degrees on their manners and customs, though as a nation they have been accounted by most writers the slowest of the slow—the Chinese of the earlier ages of the world ; or, as M. Renan is pleased in fiction to make them out, the close representatives of the dull and unimprovable English,—while his own countrymen are the very opposite, and mirror exactly the intellectual ancient Greeks, whose land was the glorious mother of everything noble, *spirituelle*, and elevating to the soul of humanity.

In accordance with the general geographical direction of early Egyptian colonization, the monuments of the twelfth dynasty are found further, or more southward, up the valley, than those we have hitherto been considering. Some points in Lower Egypt were still retained possession of, and adorned with costly buildings, as the celebrated obelisk yet standing at Heliopolis sufficiently proves. But engineering works in the Faïoum for irrigating that now most fertile province of all Egypt,—followed by the building of the extensive halls of the Labyrinth, with an appended Pyramid of no mean size,—though composed of crude brick, and *cased only* with stone,

—chiefly occupied the attention of successive monarchs. Together with these material works, however, there was a new and more elaborate organization of the religion instituted, and an ordering of the burial rites of the whole country, on the Mencherian model ; or that of general subservience to Osiris as the chief god of Egypt, and to Abydos, his now supposed final and complete resting-place, as the holy city of burial for all the land.

Of the inner life of Egypt during this period, we have abundant particulars in the unequalled range of tombs in the cliffs of Benihassan. There, in noble halls hewn out of the solid rock, with their roofs supported on fluted pillared columns, the very prototype of the long-subsequent Doric, are paintings innumerable of almost every art, trade, or amusement ever carried on by any and every branch of the people. 'Egypt of the twelfth dynasty, ' caught in the very fact,' writes M. Renan.

The actors therein are still, in their leading characteristics, the same people as, or the literal descendants of, the fourth dynasty. All the occupations, manners, or customs represented of old in the tombs around the Great Pyramid, are repeated in those of Benihassan ; there are the same toiling multitudes, the same official system of scribes, overseers, and taskmasters, and the same feasting according to order. Something, indeed, of the gloomy sameness is gone ; manufactures now compete with

agricultural operations, the plough drawn by oxen dispenses with many sheep treading the seed into the soft mud ; the cultivation of the vine and the process of wine-making, diversify the scenes ; flax may be traced through its several stages,—men reaping it in the fields, and women weaving its fibres indoors. But there sits the great man still in colossal grandeur and unbending severity, overlooking the busy hive, every one of whose human bees is working for his benefit. And he still enjoys his field-sports much as his ancestors did before him, but with a variation ; for now the ropes of the clap-nets are led by ingenious devices to his hands, as he sits far away on an easy-chair, so that he may have the honour, by giving a little pull to the trigger, of appearing to have caught all the birds himself. Or if his designs are against four-footed game, as the graceful antelopes of the desert,—no longer content with taking them alive and taming them,—he pursues them now cruelly, both tearing them with dogs and transfixing them with long arrows ;—whence some most touching pictures of a poor gazelle turning round in pain to lick the place where one of these darts is standing in its flesh, and even protruding through the opposite side of its body ; or another that has fallen lifeless on its tender offspring.

Very great lords were still the many chiefs who ruled over the people, under the king ; one of them records his estates and privileges ; first the range of the eastern desert and its oasis, for his antelope-

hunting; and of the 'hinder or nether pools' for his bird-catching; second, 'the land of Raophis,' or a tract near the mouth of the Faioum, and 'a sluice' in the eastern bank of the canal' to water it; third, the land of the Hawk mountain, and another sluice from the canal of the Faioum; fourth, the land of the 'two streams,' or a narrow strip of ground between the canal and the Nile, together with a license for enlarging the sluices both from the canal and the Nile, so as to irrigate the fields to that extent 'prescribed in the sacred book for the growth of 'the plant *asut*;' and the fifth, 'the land of the 'hare,' with a permit to construct two sluices on the Nile.

But this chief is described as holding honourable offices both in church and state; being, *first*, 'the' 'custos of the divine stable of the sacred bull;' *second*, the constable of the palace of the King Amenemes; and *third*, 'steward of the land-tax for' 'the support of the schools of the sons of the kings' 'of Lower Egypt.'

Another chief, who has been an extensive administrator, recites his own praises; for in these tombs, inscribed as well as painted, 'the dead,' as M. Renan well remarks, 'lifts up his voice and' 'relates his life.' 'All the lands under me,' says the prefect, 'were ploughed and sown from north' 'to south; nothing was ever stolen out of my work-shops; never was a child afflicted, never a widow' 'ill-treated by me. I have given equally to the

‘widow and the married woman ; and I have not
‘preferred the great to the small in the judgments
‘which I have pronounced.’

In these tombs of the twelfth dynasty, too, the military element begins to appear ; and in vaults beneath some of them, and not yet discovered, are deposited the mummies, so the hieroglyphics tell us, of many hundred soldiers who had fallen in the wars of King Sesortosis against the black Cushites in Nubia. Prisoners, moreover, are brought back from those campaigns,—and account for the negro slaves now occasionally seen in the great man’s household ; while under previous dynasties, we had met with no closer acquaintance with southern lands than the unpacking of a box containing elephants’ tusks. At the same time, however, other personages now appear on the scene, sometimes singly, sometimes in groups ; men of aquiline features, brighter colour than, and different dress from, the Egyptians ; immigrants from Arabia and Palestine.

The most celebrated pictured group of them is that which, in spite of the time being too early, and the hieroglyphics telling a perfectly contrary story, has often been alluded to as ‘*probably* representing ‘the arrival of Jacob with his family, and their ‘presentation to Pharaoh.’ But now, after they have been called Greeks, Hebrews, Beni-Israel, and many other names, Mr. Osburn reads their title as—a group of thirty-seven Jebusites, purchased for slaves from one of the petty kings of the Jebusites,

and presented by the chief Nuhophtis to King Sesortosis II. in the sixth year of his reign, on account of their skill in preparing *stibium*; a black powder produced from antimony, and used profusely throughout ancient Egypt as a cosmetic. It 'was applied between the eyelids, by means of a bodkin, as in modern Egypt; the eyebrows also were filled with it, and broad lines were painted with it under the eyes. The use of it in ancient Egypt seems to have been absolutely universal, and by both sexes; so that the labours of these slaves would be largely in requisition for the preparation of this doubtless royal monopoly.'

Invasion of the Hyksos.

And so they, the triumphant sect of Mencherian Egyptian religionists, went on dyeing their wigs and painting their eyebrows, extending their palaces, and oppressing their slaves,—until suddenly the fatal day arrived, and in a moment King Amenemes the Third, the Amun Timæus of Greek historical legend, was driven forth from his halls of granite, and porticos of so-called white marble in his Labyrinth, the wonder of the world; while his kingdom disappeared like chaff, before the sudden irruption of the terrible Hyksos, the Eastern Shepherd Kings. So at least say the Greek accounts; and they are not altogether without a foundation; though it be lamentably deep and far to find, by reason of its resting on tales derived without critical analysis

from the one-sided, partial history written by the finally dominant faction, and recorded in state temples.

A terrible dislocation occurred, no doubt, about that time in the Egyptian annals; for, from the thirteenth to the seventeenth dynasty inclusive, there are few if any kings' names recorded with certainty by the annalists; there is scarcely a contemporary monument to be found; and this period of triumphant, as well as destructive, barbarism, is said to have lasted for two thousand years by some, and a thousand years by other, hierologist authors. The latter duration is assumed by Bunsen, who agrees with many German writers, in calling the period by the name of the 'Middle Kingdom;' and painting it as something entirely different from the Old Kingdom which preceded, and the New Kingdom which followed with the advent of the eighteenth dynasty.

But here steps in William Osburn, with most important aid from his minutely critical study of such fragments of hieroglyphics as some of the tombs of the period have lately yielded up; and he shows, that the whole interval between the twelfth and eighteenth dynasties, did not exceed some two hundred years; and that the thread of Egyptian public life was never broken, or the current of Egyptian history brought to a stand during that time. True, the nation had to pass through some extraordinarily severe trials; but *they* were the very

results of the working of the Egyptian social and religious principle ; which went on developing in its appointed channels, until it finally produced such fruit as it was capable of affording, or naturally ought to bear, in the much-lauded glories and sinful culminations of the nineteenth dynasty.

But was there no invasion then, do our readers ask, by the historical Shepherd Kings ? that nation of Hyksos coming, as we have hitherto been taught, from no one knew whence, conquering by the breath of their mouth, and vanishing again as mysteriously into nothingness ; while Egypt, after suffering the terrific incubus for a thousand years, re-awoke to go on with its life and mission in the world, exactly at the place where it had previously sunk—in a sleep far longer than that of the seven sleepers of ancient Ephesus—under the feet of destroying conquerors ?

Some of these questions, on common-sense principles, answer themselves ; but to others, Mr. Osburn replies, in utter antagonism to some ancient and hitherto credited traditions,—‘Hyksos,’ as a monarchy acting for and by themselves, there were none ; but Hyksos, as Shepherd tribes, rangers of the desert, bands of mountaineers from various regions, entering Egypt by the Isthmus of Suez as travellers, or settling as immigrants, and attaching themselves to, and sometimes considerably acting upon, the nearest government there for the time being,—of these Hyksos there were many. There always were, oo, from the time that the renowned fertility and

vast extent of cultivateable land in Egypt, made immigration in that direction as favourite a project to the starving poor of surrounding countries, in and about the year 2000 B.C.,—as are the United States of America in A.D. 1866, to all who find the Old World narrow and overstocked.

The shepherd Philitis,—who, according to one tradition, fed his flocks near the Great Pyramid during the time of that marvellous structure being in progress of erection under King Shofu; and, according to another tradition, was himself the builder,—is an example of one, or rather of a whole tribe, of the generic Hyksos; though at a date long *before* the historically famous and yet not literally exact, ‘invasions of the Shepherds,’ and ‘Shepherd dynasties.’¹ These, however, whether real or fictitious, but as assigned to the later time, are all we have to deal with now; and shall find, through William Osburn, that while the Mencherian twelfth dynasty was enjoying its late victories in fancied security in Upper Egypt,—the remnants of a defeated dynasty had retreated to the swamps of the Delta. There they nursed their enmities on the

¹ In deciding whether the *historical* Hyksos could have been connected with the building of the Great Pyramid, care must be taken, if the method of absolute dates be employed, not to mix up the statements of different systems. For their absolute chronologies have vastly larger errors, and variations from each other,—than have their relative chronologies.

All the systems, for instance, place the fourth Pyramid-building dynasty, relatively before the fifteenth Hyksos. But Bunsen's absolute date for the latter is 2547 B.C., while Osburn's for the former is only 2200 B.C., and that is nearly the true astronomical date also.

thoughts of their plundered Busirides (or special places of sepulture ; where they had duly deposited, and whence the Mencherians had violently taken away, their inherited relics of the body of Mizraim Osiris, the common progenitor) ; and continually increased their numbers with immigrating Palestinian hordes ; until, feeling their strength, and watching the right moment, they advanced under their chief Saïtes, and took possession of the royal city of Memphis. It was an act of vengeance,' writes Osburn, ' in which all Lower Egypt joined, against the representatives of those who had profaned their local gods, and outraged their sense of religion. Such we have found, and shall find to be the characteristic of all the wars of ancient Egypt ;' viz., *internal* wars between rival pretensions, and opposite religious beliefs, though intensely idolatrous always.

Soon after this event, Queen Skeniophris, the successor of King Amenemes, was driven out of the Faioum and of all Middle Egypt, and her descendants only just continued to exist in distant southern regions beyond Thebes, for some generations, as the obscure thirteenth dynasty.

The Joseph Period.

In the meanwhile a strong government had evidently been formed in Lower Egypt, having Memphis for its capital ; where, third of the so-called Hyksos line, ascended the throne Phiops, Aphophis, or Apappus, a venerable character, who is said to

have been endued with the sovereignty in childhood, and to have retained it for nearly one hundred years. In his reign, if some annalists tell truly, came Joseph as a slave into Egypt; and then followed those scriptural seven years of plenty and seven of famine, whose effects, though general over a large part of the earth's surface, were specially pointed and intensified for Egypt, by the formation,—at the beginning of the plentiful period,—of an opening in the north bank of the great Ethiopian lake; a thing which tradition had often indistinctly hinted at, but only the researches of Lepsius and Gardner Wilkinson at the place, have recently set in a clear and understandable light. (See Plate XI.)

That the southern barrier of this lake was at Silsilis, and that its water extended, at least *during the inundation*, backwards through Nubia and 'the plains of Ethiopia,'—seems to be abundantly proved by all these regions being coated, at a height far above the highest modern inundation-level, by an alluvial deposit which ends northwards at Silsilis.¹ The hieroglyphic inscriptions also on the rocks at Senneh, and elsewhere in the south, attest a sudden and permanent lowering of the water-level in all these parts—by more than twenty-seven feet—to have taken place after the reign of the fourth king of the thirteenth dynasty, and before the beginning of the eighteenth,—or in what may be fairly taken as the

¹ See Sir Gardner Wilkinson, in Murray's *Hand-Book to Egypt*, p. 429.

age of Aphophis. On these points all seem agreed ; though they do not all consent to the effect of the barrier at Silsilis, when unbroken, having been a *permanent* Ethiopian lake. Even supposing it, however, to have been only an extension of the inundation-surface,—still an extension so vast as that must have been, and in position, above Egypt, must have had to a great degree a lake-effect: *i.e.*, in tending powerfully both to equalize throughout the year the overflow of the Nile in Egypt Proper ; and to relieve much of the excessive labour of the peasants, as obligatory on them ever since, at low Nile, in pumping up the water for irrigation purposes, by sheer manual labour.

While, if we allow W. Osburn's fuller hypothesis of a more nearly permanent lake ; then, when such lake was emptying itself slowly through the fractured or wearing northern barrier,—the extra supply of water yielded thereby in the lower valleys, produced the years of plenty : and when all the accumulated stock of long-pent-up water was gone, and each new inundation from the equator,—weakened, too, by the rainless times of the general famine in most lands,—had to diffuse itself amongst the gaping mud-crevasses of the late lake-bottom of 100,000 square miles of surface,—then came those trying years of scarcity ; a calamity which in Egypt depends not so much, if at all, on rain or no rain there, but upon a scanty inundation, and the river being low down in its bed. With these times of scarcity, too, were instituted, for the

people of Egypt, Joseph's new regulations of land-tenure and sovereign monopoly, which almost revolutionized the condition of society. And came therein also, within the precincts of the well-governed land, the whole family of Jacob, the embryo nation of Israel, to be nourished for a season,—and also to be put through a very useful course of apprenticeship to the practical arts, most necessary to the full education of a tribe of shepherd and tent-dwelling people,—before being sent out to live its completer life, and perform its grandly appointed part in the open world.

Egyptian evidences of these things, whether in monument or story, seem to be numerous and distinct enough, for all authors are agreed on the reality of the main facts, and differ only in detail and ideas of causation. Thus, Mr. Osburn attributes the extraordinary wisdom of Joseph's measures as Prime Minister of Egypt, to Divine inspiration; and is never tired of showing the perfect application of every unusual Hebrew word employed in the Scriptures, when describing the sojourn, to some reality in the life or language of Egypt as now deducible from hieroglyphic interpretation.¹ But M. Renan, on the other hand, after exposing the uniform dull level of Egyptian men, 'where never appeared a great warrior, a great philosopher, a great poet, or a great artist,' adds, 'Nay, not even a great mini-

¹ See W. Osburn's *Monumental History of Egypt*, and his *Israel in Egypt*.

‘ster ;’ for Joseph, who did produce such enormous changes in the state, was not a native.

Most conducive, however, to the tender planting out of Israel in the land of Goshen, the hieroglyphic ‘land of flowers,’ on the eastern side of the Delta,—and to the sacred family’s ultimate spread over the whole of that rich triangular region,—must have been the unquestioned supremacy of the authority of the venerable King Aphophis ; towards the end of whose long reign it was, that the Hebrew immigration took place ; and even Jacob himself bowed to him in respect, when he made that touching answer recorded in the Bible, with regard to the length of his life and the years of his pilgrimage upon earth.

Rise of the Theban Power.

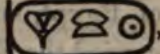
With Joseph’s death, however, when that came, then ceased this remarkably placid state of quiet rule ; for, far away in Upper Egypt the relics of the Mencherian faith were again making head, and finding at length a suitable exponent in Amosis, the first king of the eighteenth dynasty, a large fanatical army was collected,—which, making a sudden irruption northwards, repeated in reverse order the former invasion of the Shepherds, *i.e.*, of the Shepherd, or Hyksos-assisted Lower Egyptians,—taking their towns, and expelling them themselves from the borders of the ‘pure land.’ Vindictive and furious appears to have been this return-war from the upper

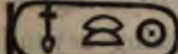
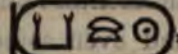
country, accompanied as it was by an opening of the graves and a desecrating of the sacred places of the conquered party. Mr. Osburn speaks from personal examination, to a whole range of fine tombs, all the faces of whose internal walls had been rudely but completely chipped away, apparently to prevent any trace remaining of Lower Egyptian rule,—called by the Mencherians, to make it appear utterly vile, ‘the *Shepherd* domination,’—remaining in the upper land.

Then probably took place the violation of many of the Pyramids, for two or three Shepherd kings were said in their day to have been buried in Pyramids near Memphis; and these Pyramids are now open and ruined to an intense degree. The particular sovereign under whom this misfortune befell, was Asses, the grandson of Aphophis. His children thereupon retreated into the Delta, and rallying around the city of Succoth or Xoïs, reconstructed there the Memphian kingdom, and commenced a new dynasty; but which appears to have been strangely misplaced in the list, or misnumbered during the confusion of subsequent times. To facilitate references, however, we insert here a tabular view of W. Osburn’s arrangement; where the order of date of the monarchs is obtained by following the order of the numbers, whether in one column, or from column to column.

CHRONOLOGY AND ORDER OF SUCCESSION OF KINGS AND DYNASTIES
THE NEWER EMPIRE, ACCORDING TO W. OSBURN.

Numbers for Order of Kings.	Names of Kings in Lower Egypt.	Numbers for Order of Kings.	Names of Kings in Middle Egypt.	Numbers for Order of Kings.	Names of Kings in Upper Egypt.	Date a.c.	Event
	DYNASTY 10. <i>Heraclopolitans or Sebennytes.</i> No names known.				DYNASTY 12. <i>Thebans.</i>	1965	Abraham in Egypt.
	DYNASTY 16. <i>So-called Memphis Shepherd Kings.</i>		Kings omitted from the list.	1	Sesortosis 1.	..	
7	Saites or Salatis.	8	Menis, son of Saites.	2	Amenemes 2.	..	Tombs of 2 men.
10	Aphophis, son of Menis.	....	....	3	Sesortosis 2.	..	
				4	Sesortosis 3.	..	Labyrinth b
				5	Amenemes 3.	..	Memphis in so-called 3d Kings.
				6	Amenemes.	..	Joseph enters Ethiopian is drained.
					DYNASTY 13. <i>Thebans.</i>		
22	Melaneres, son of Aphophis.	23	Viceroy of Melaneres.	11	Menthesuphis 2.	1750	Jacob enters and Isaac's journey begins
29	Jannea.	24 } No name known for these numbers.	....	12 } 13 } 14 } 15 } 16 } 17 } 18 }	Schemetes. Sabacon 1.	..	
30	Asses.	..	....	19 } 20 }			
	DYNASTY 14. <i>Xoites.</i>	..	....	21	Sabacon 2, father of Amosis.	1690	
37	....	42	....		DYNASTY 18. <i>Thebans.</i>		
38	....	43	....	31	Amosis.	..	Shepherd Ki
39	....	44	....	32	Chebron.	..	pelled from phis; or
40	....	45	....	33	Mesphres.	..	Egyptians conquer
41	....	46	....	34	Achencheres.	..	Egypt, and the Delta n
	Names unknown.	47	....	35	Amensa.	..	
		48	....	36	Thothmosis.	..	
		49	Acherres.	49	Acherres.	..	
		50	Armais.	50	Armais.	..	
		51	Amenophis-bekenaten.	51	Amenophis-bekenaten.	..	
		52	Encheria.	53	Al.	..	
		53	Tai.	54	Chebres.	..	
		56	Amenophis-Memnon.	..	....	..
		57	Horus.	..	....	..
			DYNASTY 19. <i>Thebans.</i>				Permanent reunion of and Upper
		58	Ramessu.			..	
		59	Sethos 1.			..	
62	Sipta and Queen Thouoria.	60	Sesostris Ramses.			1360	The oppress the Israelite Rise of Mose One Pharaoh all Egypt The Exodus.
		61	Amenepthis.			..	
		63	Sethos 2.			1320	

The new Xoite dominion in the Delta appears to have extended as far southward as the Pyramid hill of Jeezeh; and here its chiefs began to devote themselves to the worship of one of the deified kings belonging to the old empire; viz., Shafre of the second Pyramid. Something of the same sort had been done previously by Sesortosis II. and Sesortosis III. of the twelfth dynasty, who had been very successful against the southern enemies of *their* day, says Mr. Osburn; and he is testified to by their hieroglyphic names being compounded with that of Shafre; wherefore these children of Asses, in a later time, with so much need of help against the southern foes of *their* day, also compounded Shafre into their names, as ,

, , etc., and seemed even to entertain the idea of making Shafre a great god in Egypt, in opposition to the Amun worship of Amosis, in Southern or Upper Egypt. (See Plate XIII.) As a beginning, moreover, of their practical measures, 'they proceeded with the elaboration of the Great Sphinx out of its living rock, and with the rest of the works of decoration which once adorned the second Pyramid, and its stupendous precincts;' a locality long considered among Egyptologists as peculiarly connected with King Shafre, although at the time Mr. Osburn wrote, the statue duly signed, and the temple to which we have often alluded, had not been discovered.

But even from this point the Asseans were finally driven back northward, and pent up in the Delta, with the growing numbers of the Israelites ; for the great Sphinx was eventually taken possession of and completed, or its dedicating tables of granite

erected, by Thothmosis IV, or Armais,



the fifth in descent from Amosis of the Theban eighteenth dynasty ; in which line the Sphinx-form became thereafter a favourite symbol of regal power. This dynasty indeed, and after them the nineteenth, victorious through all the longitudinal valley part of Egypt, now ruled in royal state at Thebes, and carried the Egyptian monumental fame to its highest point of culmination, and even something beyond down the road to decay.

Authorities for the Eighteenth, and later, Dynasties.

Seduced, it would seem, by the beauty of the monuments, it is with these two dynasties (eighteenth and nineteenth) that most persons' ideas of ancient Egypt and Egyptian history begin.¹ When the oldest of the papyri are alluded to, they belong to these, or even later times ; equally so the mummies, for though the process of embalming and

¹ Sir George Cornewall Lewis, indeed, with his deference to Greek writings and Greek experiences only, will not allow of any real existence of Egypt until several dynasties later, or close upon the times of Greek visitations.

mummification had been practised in Egypt long before, it would appear to have depended too much on spices, and too little on 'natron,'—or too much on the plant products of Arabia and Palestine, and too little on the mineral exudations of the soil in the Libyan desert,—and therefore not to have been fully efficacious to prevent resolution of the body into 'black dust.'¹ By far the greater part, therefore, of the remains now findable, and especially the more showy works of art of the *reputed* 'ancient Egypt,' all belong to this later period of Theban domination, which extends from 1600 to 1300 B.C.

¹ 'The earliest mummy known to exist is that in the Leeds Museum, which is of the time of Ramses IX., 1100 B.C.,' says W. Osburn, p. 447 vol. i. of his *Monumental History of Egypt*.

In the *Gentleman's Magazine* for April 1866, is a short article, signed S. W. B. 'on the oldest relic in the world,' and implying that the mummy, i.e., the greater part, if not the whole, of King Mycherinus or Mencheres of the third Pyramid of Jeezeh, and therefore many centuries older than the Leeds specimen, is deposited and now to be seen in the British Museum. But the writer does not say anything about the opinions of competent men to the effect, that the bones and woollen cloth gathered up by Colonel Howard Vyse's assistants, and which make up the above so-called mummy, belonged to an unfortunate Arab who died in the Pyramid when it had been opened by his countrymen in the middle ages. The writer however does in honesty mention that an old Arabian author,—describing what his countrymen found in the sarcophagus of King Mencheres, when they ransacked it six hundred years before Colonel Howard Vyse entered the Pyramid,—says, 'that with the exception of some plates of gold, there were only the *'decayed rotten remains of a man ;'*' a phrase which expresses extremely well the idea W. Osburn has formed from other cases, of the bad results of embalming under the earlier dynasties. The phrase also throws much light on the Colonel's own description of what he found in the interior of the third Pyramid, and even on the sarcophagus, viz., 'a good deal of this deposition (black dust) was also found in the large apartment; and the dung of large birds, probably vultures, appeared in many places, particularly on the sarcophagus, and seemed to have been there for many years.'—Vyse's *Operations at the Pyramids of Jeezeh*, vol. ii. p. 82.

'Which was of great antiquity, at least as early as the beginning of the eighteenth dynasty,' is an expression of Sir Gardner Wilkinson in reference to a particular architectural decoration on Egyptian monuments; and it is just and true enough when applied relatively to other Pharaohs whose names are frequently referred to in modern times, such as Shishak of the twenty-second dynasty, contemporary with Solomon; Tirhaka of the twenty-fifth, contemporary with Hezekiah; and Hophra of the twenty-sixth, with Zedekiah. Far more just still, is the phrase, when employed in contradistinction to *'antiquities,'* connected with all the race of the Ptolemies and Cæsars; when new inhabitants, new times, new civilisations, and new ideas had introduced into Egyptian life a variety of features which,—though we may find them described in hieroglyphics cut grandly into the temples of Denderah, Ombos, Philæ, and Esneh,—were perfectly strange to the Egypt of the first twenty dynasties.

Requesting our readers, therefore, only to bear the salutary correction in their minds, for their own private information, if necessary,—that the eighteenth and nineteenth dynasties are of the new empire, and even the later part of the new empire, and very recent as compared with that older empire, in whose time the Great Pyramid was produced,—we would pray them by all means to plunge into any and all works wherein those dynasties' remains are described,—though under the mistaken implication of

their forming the very origin of all Egyptian history. For what we, as students in this matter, require first, is,—to gather as much special and particular experience of facts and personages as possible ; and we may be able to rectify the chronology and eliminate the erroneous impressions under which they are, or may be presented, afterwards.

Now most books hitherto published on Egypt are of this order. For until recently, the only large collections of artistic pictures belonged to these two dynasties or to subsequent ones ; and it was chiefly to see their showy sculptures existing in fact on temple-walls, and there representing the so-called ‘ Ancient Egypt,’—that every winter for the last fifty years has witnessed a fleet of wealthy travellers’ boats anchored off Karnak, while their owners were exploring the wonders of Thebes and the Memnonian Palace ; or while traffickers in *antiques* were grubbing about amongst the tombs, seeing what they could steal.

‘ In Thebes we abode,’ writes one of the best of German travellers, ‘ for twelve over-rich astonishing days, which were hardly sufficient to learn to find our way among the palaces, temples, and tombs, whose royal, giant magnificence fills this spacious plain. In the jewel of all Egyptian buildings,—in the palace of Rameses Sesostris (which this greatest of the Pharaohs erected in a manner worthy of himself and the God, “ *To Amun-Ra, King of the Gods,*” the guardian of the royal city of Ammon),

‘on a gently rising terrace, calculated to overlook
‘the wide plain on this side and on the other side
‘of the majestic river, we kept our beloved King’s
‘birthday with salute and flags, with chorus-sing-
‘ing, and with hearty toasts proclaimed over a glass
‘of pure German Rhine wine.’¹

Champollion’s grand work, in four volumes of long folio plates, deals largely with the eighteenth and nineteenth dynasties: for, beginning at Ipsambul in the extreme south of Nubia, with the great Ramses cavern-temple, it comes up successively northwards to Ombos, to Thebes, to Denderah, to Benihassan, and finally to Sakkara,—always picking out the most dazzling scenes, and spirited groups of courtly or warlike figures, and which are usually of the new empire; mixing all sorts of subjects just as they come on the monuments; and finally concluding without any notice of the Pyramids, those silent and almost sublime witnesses of an earlier and more serious time.

Rosellini’s great work in three volumes of folio plates, will also yield data for the life of this period to a large extent, and his engravings are arranged in subjects; vol. i., referring to history and *public* life; vol. ii., to the trades and employments of everyday *private* life; and vol. iii., to temple scenes and matters connected with the religious belief of the time.

Lepsius alone arranges his plates in chronological

¹ Lepsius’ *Letters from Egypt*.

order, and enables any one in his volumes v., vi., and vii., to study no less than ninety-seven large plates of all subjects belonging to the eighteenth dynasty, and eighty-four belonging to the nineteenth. A magnificent contribution to knowledge ! Not indeed all original or contributed for the first time, for many of the plates represent the same monuments figured previously by Champollion and Rosellini ; but there is advantage in comparing the several styles and capabilities of the different modern artists ; and while the palm is perhaps due to the German edition for the most efficient rendering of the mystical awe and fate-like solemnity of animal-headed gods,—the prize for human portraiture is undoubtedly to be given to Rosellini, who contrives to indicate a degree of refinement in nature, depth of feeling, variety of expression, and wealth of human sentiment, in some of his heads of kings and queens, which leaves all his competitors far behind.¹

Scenes in the Eighteenth Dynasty.

But now let the trumpet sound,—the curtain rise, on the eighteenth dynasty, and who are these on the painted monuments before us ? Brick-makers ; and desperately are they toiling at their ungainly occupation. With backs bent horizontal, they dig up

¹ Consult also the great French work of 1800, and subsequently Gardner Wilkinson's *Ancient Egypt*, edition of 1847, or later, and Burton's *Excerpta Hieroglyphica*.

the tough clay with short hooked implements, merely a small improvement of their natural hands. The process of moulding the clay, tapping out the pressed lump, piling the rectangular blocks, and carrying them away in collections of as many as one man can just stagger under,—are interesting enough in an industrial art and trade point of view. But there all the time sits the taskmaster with his stick; a cinnamon-coloured, clean-shaved, black-wigged Egyptian he is; and then we may perceive that the brick-makers are not his countrymen, but light brown men, with aquiline noses, grey eyes, and naturally growing short beards of reddish hair;¹ a more northern race evidently than the Egyptians, possibly Israelites, and certainly Palestinians of some order from the now overrun regions of the Delta.

Foreign slave-labour has evidently come into vogue, since we last made acquaintance with these men of the monuments. Some amount of ordinary field-agriculture is still memorialized; but it seems now nearly overborne by garden cultivation, and these gardens are more or less ornamental plots round grand mansions and gorgeous temples, sur-

¹ 'From what I have observed amongst the numerous tribe of Jews, first at Gibraltar, now here (Algiers), and further on throughout the East—of the many thousands I have seen, a peculiar colour of the hair is so striking as to seem characteristic of the nation. Amongst us, Jews have almost invariably hair of the deepest black, but this is a light auburn, of a tint I have never seen before. If the letter to the Roman Emperor may be relied on, this was in all probability the colour of our Saviour's hair.'—W. R. Wilde, *Narrative of a Voyage*, 1840.

rounded with little brick hutches for retaining the slaves at night. In place, too, of scenes of open-air country-life, and sturdy chieftains inspecting their stock,—the majority of social pictures is now devoted to the gatherings of the rich in festive town-halls; and these rich again are found to be only dependants in different kind or degree on the monarch for the time being.

In him the king, the Pharaoh, now concentrates all the wealth of the people, all the life of the nation. 'In old Egypt scarcely an act of any Pharaoh is recorded in the tombs of his subjects; nor does his name appear at all, save in the names of their estates, and sometimes in their own names. But in the tombs of the new kingdom, in the times that followed Joseph, all this is reversed; for there is scarcely a tomb of any importance, the principal subject of which is not some act of service or devotion performed by the excavator to the reigning Pharaoh.

'Nor is this difference confined to the secular princes of Egypt only. We found the priest's office in old Egypt to be a mere appendage to the secular functions of the princes and nobles, performed, invariably in the cases where the performance is depicted, by proxy, and by the hand of menials and dependants. The contrast to this presented by the monuments of the later epoch is marvellously perfect. The priest has risen greatly in authority and importance in the State. This office becomes more

‘and more exclusive and hereditary, until at length
‘he ascends the throne of the Pharaohs, and rules
‘Egypt by a dynasty of priest-kings.’¹

How perfectly these changes are in accord with what the Bible describes as the results of the administration of Joseph, viz., that all the land and all the cattle, and at last all the people themselves, were sold to, and became the possession of, the monarch; except only the lands and goods of the priests, these he bought not. The result of the change is eloquently borne testimony to by M. Renan, in his description of the difference between the subjects of the paintings in the tombs of the fourth, fifth, sixth, and twelfth dynasties, as compared with those of the eighteenth;—which last ‘seem to have been invaded
‘by a whole *pantheon*, numerous, and accompanied
‘by fictions horrible, and at the same time the most
‘silly that the human brain has ever conceived.’

The religion, therefore, did not advance in character when so peculiarly protected, though it multiplied its external indications. The walls of palace, and temple, and tombs are now indeed everywhere covered with figures of grotesque animal-gods; they increase in number with the progress of the reign, or the pleasure of the king; and are always more or less in waiting upon him as mere puppets to receive his royal pleasure; though destroying angels to carry it out against his foes. To present him with one symbol of the key of life to smell at, was enough

¹ Twenty-first dynasty.

in former times ; but now these flattering gods advance on either side, and anoint the monarch with long streams of innumerable repetitions of the symbols ; and every hieroglyphic sentence is pretty sure to begin, or end, with the oft-proved falsity, 'King 'so-and-so, living for ever'!

Of course the said king does not improve in disposition under all this adulation and indulgence, for cruelty amongst other vices becomes a dominant characteristic. A most tender exhibition apparently of family affection, is shown gracefully depicted on one of the monuments of Amenophis (eighteenth dynasty): the queen-mother gently cherishes her stripling son ; and he with a magnificent head-dress—the ancient wig made now fit for a king—is seated on her knee, her favourite child, affectionately reciprocating her regard ; and the scene might appear very passable and even commendable—did we not remark that the boy's feet are all the time on the backs of two sets of captives, Palestinians and Negroes. These poor wretches lie there with their hands cruelly tied tight behind them, their bodies and limbs bent up triple, and internally spiked collars round their helpless necks ; to which collars strings are attached, so that the youthful prince, holding them in his hands, can, by jerking on them for amusement, instantly set half-a-dozen grown men into most exquisite bodily pain.

But this was amusement also for the father-king of Thebes as well ; all these kings' ideas of a glorious

triumph, either for war or peace, seeming to concentrate in riding in a chariot with prancing horses, (horses, it will be observed, are now added to Egyptian live stock, but only employed in war, or for the king's purposes,) and dragging behind them two long lines of tortured, writhing captives. Sometimes these are Negroes, sometimes Asiatics, but always with their hands and arms bound together in some almost impossible and always perfectly helpless position; while the terrible spiked collars round their necks are connected with the ropes held by the king,—every sudden prance of whose horses must produce unnumbered quiverings in all those lacerated human nerves. The expression of various agonies in these captives, obliged to keep running along after the king in his chariot, and with no hand available to ease the heavy collars which are cutting into their necks,—is one of the highest efforts of the Egyptian artist. It is too evidently from the life, from scenes witnessed often; and one hardly knows which to pity most, the more childish symptoms of yelling and pain amongst the Negroes, or the deeper feelings of the more manly and decorous-visaged bearded men of the North; but both alike suffer all that human nature can bear, and for the purpose merely of enabling an Egyptian king to feel prouder than ever, before his slavish and enslaved people.

Arrived at his palace, then how overwhelming is the state which attends the monarch there! All

the Egyptian nobles are grovelling about him in fancy costumes, as some kind of Lord Chamberlains, or fan-bearers, or gold and silver stick-carriers. Young damsels are beaten before him on their bare backs, by stout men armed with sticks; and truth can seldom be heard in those royal halls, for the king must never see or hear anything that can displease him, and whatever *he* does is perfectly right. He is held to be eternally justified of everything he can do, and inscriptions are continually proclaiming his piety and purity and splendour and power; while his enemies are by very consequence the impure and abominable ones of the earth, and seem to comprise in idea all who inhabit the whole world, save the Egyptians themselves.

Of their Religious Principles.

With that race, self-justification, under any circumstances, was from the first a leading principle of their religion. The forms of their worship and the number of their gods were continually altering from dynasty to dynasty, and were various at the same time in different parts of the country; but the power and right of a man—*i.e.*, an Egyptian man—to justify himself, not against his fellow-man, but against God, was an essential and central thread of their system wherever a single Egyptian existed. And a thread of it, too, which they not only never relaxed their hold of, but kept continually weaving other threads of bad religion and perverted

morality into it, until it formed at length the veritable cart-rope for drawing the national sin.

Another neighbouring nation had shown deep respect to the maxim of religious wisdom and truth, 'let not the sinner say that he hath not sinned; for God shall burn coals of fire on the head of him, which saith before the Lord God and his glory, I have not sinned.' But every Egyptian was taught by the ritual of the book of the dead, to prepare to stand up before Almighty God, and declare—

1. I have done no sin of omission.
2. I have done no sin of transgression.
3. I have neither done any sin, nor omitted any duty to any man.
4. I have committed no uncleanness.
5. I have not spoken lightly.
6. I have not blasphemed with my mouth.
7. I have not acted perversely.
8. I have not accused any man falsely.
9. I have not stolen anything belonging to God.
10. I have not shortened the cubit.
11. I have not shaken off authority.
12. I have not been idle.
13. I have not been a glutton.
14. I have not been a drunkard.
15. I have not forged any of the divine images.
16. I have not withheld the seven linen garments due to the priests.
17. I have not been avaricious.
18. I have not falsified the weight of the balances.
19. I have done no violence.
20. I have not multiplied words in speaking.
21. I have not changed the customs; neither have I enacted foreign abominations.
22. I have not uttered boasting words;

and so proceeds the self-justification, through no less than seventy-four different items.

No true Christian can, of course, regard such a system but with fear and horror; looking upon it, as he must do, as expressing the very antithesis of all which *he* regards as religion; or of the first step toward religion at all, in the light in which it has been revealed to man by God, and those whom He has enlightened for that purpose.

Hence, there need be no question raised, by the hierologists,—as to whether we are deeply learned enough in all the mysteries and vagaries of Egyptian idolatry, to fully comprehend every supplemental idea, which the chief latter-day sophists amongst them attached to each new animal divinity they invented;¹ or the precise office they assigned

¹ The gradual progress from bad to worse in their religion, the more the Egyptian people advanced in arts, wealth, power, and their own proverbial wisdom,—affords a striking historical confirmation, of some of the leading arguments in a recent admirable pamphlet, entitled, *Thoughts on the Doubts of the Day*, by the Dowager Lady Shelley. (London, 1864. Harrison and Sons, 59 Pall Mall.)

True religion, the writer there argues, wherever it appeared in primeval times, 'shone forth suddenly, and in all perfection and purity, agreeably with the manner of a gift, or revelation from the Most High;' while 'the grossest errors came afterwards to obscure it by degrees, side by side with the arts, inventions, and discoveries of man.'

And again: 'In some cases (as of the animals and monster gods invented by early pagan peoples), these creations of the imagination are so strange and horrible, that we are quite at a loss to account for their origin in nations otherwise intelligent. We can only suppose that when the builders of the Tower of Babel were dispersed by God for the misuse of the divine gift of language, they fled to all parts of the earth, carrying with them debased ideas of the God whose power they had defied, which were reproduced later in the

to one god with a jackal's head,—or another under the form of a baboon,—and another still as a monster hippopotamus, or horrible crocodile. These things, we say, need not be so very particularly inquired into, as if just the last touch of colouring given to one of the more obscure of them, were capable of changing the place of all Egypt from the left, to the right, hand of the Great Judge on the last day,—because they are all of them in their entirety the very necessary consequences of a principle which is rotten at the core ; and form a course which, compared with revealed religion, was permanently wrong from the first.

Hence, the more religious the Egyptians grew, after their own fashion, the more they rebelled against the God of heaven. Similarly in their morals,—a highly moral people were they in marriage, having generally only one wife ; but that wife was too often, both with the princes and people, within the most revolting incestuous degrees of propinquity ; so as to be horribly criminal in the eyes of all other nations. And an industrious people were they too, producing great public works ; but their plan of operating was through the power of slavery, and the cruel oppression of all the poor and weak, and defenceless ones, whom they ever came

' revolting conceptions of the Hindoos, Chinese, and Egyptians, amongst whom (if true religion had been an invention of man's intellect), we might have looked for a most exalted idea of God ; for it is well known that they enjoyed a much higher state of civilisation than was ever attained by the family of Abraham.'

into contact with. For a while, this Pagod figure grew and flourished mightily in the earth ; but in the hour of its apparent greatest strength, was it touched by more than mortal hand ; and calamitous was the ruin which then supervened, and has never ceased yet.

The kind of hero, developed in Egypt.

It was under the reign of Ramses II., of the nineteenth dynasty, that the Egyptian power and might seemed to have reached the most stupendous proportions. He was reckoned to have been the greatest, wisest, and best of all the monarchs that ever sat on the Egyptian throne, and his reign lasted more than sixty-six years. By W. Osburn, and apparently by R. Lepsius also, his name is read Sesostris-Ramses,—though Chevalier Bunsen rather violently contends that there was no Ramses ever called Sesostris ; and that all the Greek and Egyptian legends connected with a half-fabulous hero named Sesostris or Sesoosis, belong truly to Sesortosis II., of the twelfth dynasty.

It was this Sesortosis II., insists Bunsen, who built a fleet of long ships on the Red Sea (though where the ship-timbers could come from in that arid region, it is difficult to say), embarked with more than half a million of soldiers, sailed through the Straits of Babelmandeb ; landed, and in turn conquered Arabia, India, Bactria, Scythia, and Persia, making a grand tour of conquest through all the

world of Central Asia ; and finally returned home through Thrace and Asia Minor, with wealth enormous, and captives innumerable.

But here comes into play once more the varied critical acumen of W. Osburn, in showing that no such Sesostris as he of the legends ever existed. A bold conclusion, but in which he has since been well confirmed by M. Renan, whose superior sharpness to M. Bunsen, enabled him to detect that the Sesostris described by Egyptian priests to classic visitors of Greece and Rome—was ‘an artificial personage, composed of pieces and morsels.’¹ To Herodotus, the said priests of a conquered land, related that their former native king was far greater in his day than Cambyses, who then filled the mind and attention of the enthusiastic Halicarnassian. To Diodorus Siculus, in whose eyes, again, Alexander the Great was the hero of the world,—they made out that Sesostris had exceeded *him* in every particular, and especially as an intellectual conqueror overrunning half the world for the sake of an ‘idea.’ And to Germanicus, with the historian Tacitus in his suite, they made their Sesostris appear as a more methodical and business-like soldier, than any notable commander of the approved Roman stamp ; or one who looked on a campaign in the light of a mercantile transaction, whose propriety was to be measured by the muster-roll of tributary provinces it should produce, or justified by the weight of solid silver and

¹ *Revue des Deux Mondes*, p. 665, April 1865.

gold sent in ;—evidently in every case suiting their tales to the notions of hero-worship amongst their listeners.

But with regard to what any genuine Egyptian heroes either really did do, or would have ambitioned to bring about, in those earlier ages when their monarchy was as yet unconquered by foreigners, and uncontaminated by stranger nations,—there, W. Osburn appears to have caught the spirit of the Mizraite mind with astonishing success ; and to have realized long ago the nature and tendencies of their polity so precisely,—that M. Renan's much later researches, while they have confirmed much, have been able to add little, and alter less. W. Osburn's words, therefore, remain the most instructive that can be quoted, and run thus,—‘ We have yet
‘ further to state on this point, and with the same explicitness, that no such idea as the conquest of the
‘ world had presented itself to the mind of Egypt in
‘ the days of the monarch Sesostriis-Ramses, whose
‘ monumental history is now before us. Egypt
‘ alone was the world of Egypt, and its entire subjugation to the Theban sceptre was the loftiest
‘ pitch to which the ambition of the Pharaohs had
‘ ever soared at any epoch. Foreign conquest was
‘ utterly abhorrent to their modes of thought. The
‘ districts watered by the Nile constituted the only
‘ country in the world worth possessing. The sons
‘ of Mizraim were the only beings worthy to bow to
‘ the sceptre of Pharaoh. The men of all other

‘ nations were inferior and degraded races, and their
 ‘ countries unclean and abominable. The highest
 ‘ honour to which a foreigner could aspire in Egypt
 ‘ was to be a slave ; and, to minister to her luxuries,
 ‘ was his country’s highest distinction. What charms,
 ‘ we repeat, could foreign conquest have for a nation
 ‘ holding sentiments like these, and with whom, even
 ‘ to overpass the bounds of Egypt, implied ceremonial
 ‘ pollution ?’

Egypt, then, in the course of its long career of unimpassioned, exclusive, self-satisfied existence, gave birth to no conqueror of the world to rival and excel Alexander the Great, the most brilliant hero of the Arian races of mankind ; but succeeded in producing a great man of its own order, viz., Ramses II.,

of dynasty nineteen, or



This monarch,

moreover, may be at once connected with the foundation of truth at the bottom of the absurd tales told to the Greeks about the fabulous Sesostris, in this ;—that whereas the latter is said to have far exceeded all his predecessors in building, even to the extent of erecting a temple in every city throughout the land of Egypt, which was then reputed to contain thirty thousand cities,—Ramses II., is found by examination of the existing monuments,—whether still standing in Egypt, or transported to European museums,—to have left more architectural remains

impressed with his name, than have done all the sovereigns of Egypt put together. And yet they number, from Moses down to Ptolemy, about one hundred and fifty known kings, and their reigns extend over nearly two thousand years.

This most remarkable fact, in itself, at once establishes one kind of relative superiority between Sesostri-Ramses and all other native Egyptian kings; and a closer examination of all his principal works, such as the Propylons of the New Palace of Luxor, the Ramesseum of Western Thebes, and the great cave-temple of Ipsambul, will disclose some other notable particulars. These works, for instance, all abound in colossal representations of Sesostri-Ramses going out like a giant to battle; his chariots drawn by fleet horses galloping forth before him over all the walls; then the battle, in which his enemies are smitten in every conceivable manner; and lastly the king himself the day after the battle, seizing a compendious group of some dozens of captives by the hair of their heads, after they have been tied to a stake, and braining them all with a sweeping blow of his mace; while one of the animal-headed gods, possibly of his own or his father's creation, looks on approvingly, and offers him even a more destructive weapon. Wherefore, such slaughtering and truculent scenes, cause most persons to imagine *from the 'monuments,'* that Sesostri-Ramses, though only Ramses II., and not the traditional Sesostri of fable,

must have been a most warlike and conquering king.

But then comes the strange counter information from the hieroglyphics accompanying these enormous sculptures,—that they all represent one and the same action, fought in the fifth year of the reign of the king, near Pelusium in the Delta ; and not a very large or glorious affair either. Yet, as the monarch went on for forty years of his long reign, immortalizing the selfsame military exploit,—we may draw the conclusions, *first*, that he had no subsequent battles to boast of ; and, *second*, that he was very desirous of being thought a mighty man of valour ; in aid of which view he could order any amount of praise to be conferred upon himself, in these public documents ; ‘*Moniteurs* of ‘the time,’ says M. Renan, ‘and false by consequence.’

But how did Ramses acquire the immense command of labour, which he undoubtedly possessed for the execution of his numerous monuments, without having recourse to prisoners of war ? may well be inquired ; and the answer is, ‘By political ‘subtleties acting on the weakness of the Xoite ‘Pharaohs in the Delta, and their numerous but ‘peaceable Israelite subjects.’ Cunning and cruelty seem to have characterized the man far more than bravery ; and though he be that identical Pharaoh ‘who knew not Joseph,’ in the way of not remembering the compacts of friendliness made with

him and his descendants—yet he seems to have thoroughly understood and practised some of his principles of administration, in so far as concerned strengthening the throne and enriching the monarch.

In the various portraits which have come down to our times of Sesostris-Ramses, whether in sculpture or painting, he is without doubt a magnificent-looking man, with even a bland expression of countenance, and the inimitable air of being a favoured scion of very high family and long royal descent; but there is, withal, a semi-concealed appearance of cunning, and a power of compassing a cruelty, with all the time an urbane smile on his lips,—that leaves one quite at a loss to conclude what he might not attempt next.

In one way or another he did in the course of his reign, at last contrive to bring about the dominion of all Egypt, Upper, Middle, and Lower, to the Diospolitan sceptre; a scheme in the heads of all his predecessors, but never fully carried out by them, on account of the dynasties in the Delta. The last of these, however, the Xoite, became in his time reduced to a single infant of a year old, whom he then,—in his capacity of ally and guardian,—immediately married to his eldest daughter Thuoris, already far advanced in middle life; and by that method, without a flaw in its legality, and without bloodshed,—but a union which in course of nature could be attended by no inconvenient dynastic

consequences,—he gathered up all that had once belonged to the Xoite dominions into the appanage of his Theban throne. In such manner came the Israelites in the Delta under the control of Sesostri-Ramses, originally of the upper country; and he lost no time in setting them to work day by day in digging irrigation-canals, and in buildings of various kinds throughout all the length and breadth of the united country; in testimony of which, either the ruined mounds and buildings throughout Egypt may be examined, or the terse and effective description of the Bible remembered :—

‘And the children of Israel were fruitful, and
‘increased abundantly, and multiplied, and waxed
‘exceeding mighty; and the land was filled with
‘them. Now there arose up a new king over Egypt,
‘which knew not Joseph. And he said unto his
‘people, Behold, the people of the children of
‘Israel are more and mightier than we: come on,
‘let us deal wisely with them; lest they multiply,
‘and it come to pass, that, when there falleth out
‘any war, they join also unto our enemies, and
‘fight against us, and so get them up out of the
‘land. Therefore they did set over them task-
‘masters to afflict them with their burdens. And
‘they built for Pharaoh treasure-cities (magazines),
‘Pithom and Raamses. But the more they afflicted
‘them, the more they multiplied and grew. And
‘they were grieved because of the children of
‘Israel. And the Egyptians made the children

‘ of Israel to serve with rigour. And they
‘ made their lives bitter with hard bondage, in
‘ mortar, and in brick, and in all manner of service
‘ in the field : all their service, wherein they made
‘ them serve, was with rigour.’

Queen Thuoris and her adopted son Moses.

Then came, as every one knows from the Bible, severe measures of repression ; and at last the royal order that ‘ Every son that is born, ye shall cast into the river.’ In the meanwhile, however, there grew up in the gentle mind of Thuoris, some fellow-feeling of compassion for the strangers so cruelly oppressed by the king her father. She had been sent away from Thebes where he resided, by that unfeeling despot in his family,—but who smiled so serenely in public,—to be his vicegerent in the Delta, along with her helpless infant husband ; and there she occupied herself chiefly with attending to sundry religious services, to which she had been in a manner dedicated, even before the strange marriage, forced upon her without any possibility of refusing. Such a religious ceremonial employment it is supposed to have been, which took her down to the river’s bank on the eventful morning of the exposure of the child Moses in the ark of bulrushes. Her true womanly feelings, as well as her own experiences of undeserved oppression, prompted her to pity the Hebrew child ; her position as queen-vicegerent enabled her to brave her then distant father’s infanticidal com-

mands ; and her married state allowed her, without any appearance of impropriety, to become a seeming mother to the young castaway.

For forty years, or, as Mr. Osburn says, from the monuments, forty-four,—was Moses thereafter cherished in the palace of Lower Egypt ; the bonds of his countrymen were much loosened ; and poor Queen Thuoris, at the end of that time become an aged woman, received much comfort and assistance in public affairs, and affectionate attentions in private life, from her Hebrew protégé ; but at last came the trial. Her father at Thebes had died, and had been succeeded by his son Amenepthis ; and he, after reigning by himself two years only, had also died ; and now the succession to the whole of Egypt had fallen on Queen Thuoris in her old age. There was her husband Siphah to be sure ; but he was an incompetent, the last expiring member of a royal race dying out from exhaustion of faculties ; he could never rule as an independent sovereign of a powerful people,—but would Moses, so long in *fact* her adopted son, and who had so dutifully performed her behests for so many years ; and shown such superiority to all his fellows,—equally in learning as in war,¹—would *he* now become in the face of all the world her *legally* adopted son, and heir to the throne of the whole of Egypt ?

To one like Moses, brought up all his life, save its first few days, in a palace, the opportunity must

¹ See Josephus, Book II. Chapter x.

have been, in a worldly point of view, most attractive. But, as we learn from several passages in the sacred Scriptures, 'by faith Moses, at this time, refused to be called the son of Pharaoh's daughter;' abandoned all his splendid prospects of an earthly throne, and preferred going forth alone and in poverty to share the burdens, and sympathize with the grievances of his oppressed countrymen. Presently, too, even to flee into the desert before their ill-feelings and want of appreciation; as well as before the offended laws of Siptah, residing then in Lower Egypt.

A sad trial must this refusal of Moses have been to the aged Queen; who thereupon retired to Thebes, and occupied herself during the remainder of her life, partly with the education of the infant son of the late Amenepthis, or Sethos II.; and partly with the preparation of her own and her husband's tomb in the Biban-el-Moluk, or valley of the tombs of the kings at Thebes.

Of the various monumental proofs that Queen Thuoris performed her part of Regent to the youthful Sethos II., faithfully and conscientiously, both in its public requirements and private duties, as long as she lived; and also that her nephew,—in spite of the loving care spent upon him, and 'the special' books written for his sole use and behoof, containing all the good actions of his predecessors,—turned out nevertheless an exceedingly bad and even abandoned character,—we will not attempt to say

much in this place; for we should have to draw almost entirely from W. Osburn, and our readers would find greater advantage in referring direct to his fuller accounts, original conclusions, and eloquent pages.

Suffice it then here, that we hurry on to the time, when both Thuoris and Siphthah being dead, the graceless profligate Sethos II., ascended the throne. One of his first acts thereafter, seems to have been to hasten to the city of Ramses in the Delta, and on finding the Israelites no longer toiling as desperately for his royal advantage, as they used to do for his grandfather, Sesostris Ramses,—he instantly renewed their hardest burdens in that excess of unfeeling manner, which caused the complaints of the oppressed to rise up to Heaven; and occasioned the recall of Moses out of Midian, to be the deliverer of his people.

The final Crash.

Most minutely does William Osburn criticise the first nine of the scriptural plagues of Egypt,—showing that they were each of them special intensifications of natural features of the country or climate; almost as if it had been the Almighty's intention to show the Egyptians the inefficiency, one after the other, of each of their gods whom they had set up in charge over those elements. At the same time, this peculiarly prepared and able author shows clearly, that the order in which they are described, proves that the series of these dread plagues

extended over nearly a year ; thereby allowing time enough for the mighty preparations to be made for the movement of so enormous a bulk of population, as the Israelites had become at this period ; viz., not far short of four millions. An impossible number, remarks W. Osburn, to remove in these present days ; but the exodus, we must remember, was the last, or he should perhaps have said, a continuation, of the several great migrations of the human race, which had been directed and assisted by the finger of God.

At length the historian comes to the tenth plague, the death of the first-born. 'In the execution of ' this most terrible judgment, God thrust forth His ' own arm from behind the veil of nature and her ' laws, and Himself struck the blow. Even on this ' occasion, it was not until another message of warning had been given to Sethos, and rejected ; nor ' until he had finally dismissed with obloquy, the ' messenger whom God had thus mightily accredited, ' that the blow was stricken.' This is what W. Osburn writes ; while the Bible similarly says, ' And ' it came to pass, that at midnight Jehovah smote all ' the first-born in the land of Egypt, from the first-born of Pharaoh that sat on the throne, unto the ' first-born of the captive that was in the dungeon ; ' and all the first-born of cattle.' But Chevalier Bunsen writes,—' We have stated in the preceding book ' that the exodus was only an episode, or rather one ' link in a fearfully vast, well-devised, plan, carried

‘into execution with sagacity and resolution, of
‘avenging liberty. That the Palestinians who in-
‘vaded the country were, as the Egyptians say,
‘called in by Moses, must be considered as an in-
‘vention of national hatred; but the invasion is
‘historical, and most important. It was a cover for
‘the exodus, and the great Sicilian Vespers by
‘which Asia took her revenge upon Africa. These
‘Palestinians were really, after more than two cen-
‘turies of oppression, *the messengers of the Lord*,
‘when, in the third year of Menepthah, son of
‘Ramses II., rushing down from the north, they
‘slew all the first-born even in the king’s palace.’

We do not agree with the too rationalistic view of the great philologist as to the agency which wrought on that memorable night. But if he believes firmly in what he has written, then his further testimony is more important than ours, or even than William Osburn’s (though that should also be studied), to the effect,—that Egypt never recovered the results of the exodus; that the third volume of Manetho’s history, or from dynasty twenty to dynasty thirty,—merely records a succession of degradations, until the Egyptians became utterly enslaved to foreigners,—their religious abomination at all times; were obliged in turn to expend all their inimitable architectural powers and artistic skill, with which they had erected the idols of old Egypt to ensnare the world,—to glorify their several ‘impure’ conquerors; until now, after having been for ages

and ages the slaves of slaves, and the basest of the base, these artistic capacities are completely departed from them,—and they are left a useless and effete people, an astonishment and a hissing on the face of the earth, until it shall please the Lord to take pity on them again.

But thus Chevalier Bunsen *concludes* his view of the exodus, 'the historical exodus,' as he terms it. 'The courage and judgment of the Egyptians failed in face of the moral faith so energetically evinced by the man of God. At length a body of troops was despatched to attack the multitude as they withdrew. These perished in the waves; and the weakness of Egypt became self-evident to their Palestinian and Arabian neighbours, who fell upon the disorganized country which was humbled as it never had been before. At the end of thirteen years the enemy was expelled, but the strength of the nation was exhausted. After the brilliant semblance of a restoration by the great conqueror of the twentieth dynasty, the power of the Pharaohs was so shaken by the Assyrians that it never recovered itself again for any length of time. Nor did the work of the invaders produce any good to their country or to the world. The movement in behalf of human dignity and of liberty was alone blest for those who understood it and for the human race.'¹ 'At all events the invasion and exodus became the death-blow of the new empire.'

¹ Bunsen's *Egypt*, vol. iv. p. 589.

Plainly then here is no difference of note as to the resulting material fact,—that with the night of the exodus, when the visible career of Israel began, and when ‘history was born,’ the ancient glories of Egypt commenced rapidly their fatal decline. Our absolute dates, moreover, in chronology, cross at this point of the exodus with those of other authorities,—from some of whom we had differed largely when discussing the earlier dynasties; for both Bunsen, Lepsius, and Osburn are all within a handful of years agreed upon the time 1320 B.C. nearly; and differ for the name of the king under whom ‘the man of ‘God’ ‘led the departure,’ only between the son or grandson of Ramses II.

Hence, having been enabled to trace, to the best of our humble ability, no small portion of the mental and manual characteristics of the Egyptians, even from those primitive times of Egypt’s existence, when that country stood solitary and alone in the recorded annals of mankind,—down to the fullest expansion which those characteristics ever subsequently experienced in better-known and more abundantly peopled periods of earth-history,—it is our duty now to return, with such help as may thus have been procured, to our long-interrupted investigation into the mystery connected with the origination of that earliest, and most important of all human monuments, the Great Pyramid.

CHAPTER VII.

ORIGINATION OF THE GREAT PYRAMID, ON SCIENTIFIC GROUNDS.

TOWARDS the close of his Section v. Division III. Book II. of his *Egypt's Place in Universal History*, Chevalier Bunsen, in reviewing the progress of Egypt from dynasties first to twelfth,—has some well-put philosophical remarks ; which, though accompanied by a few rather doubtful assertions,—yet giving as they do, his very scholarly ideas on the difference between ordinary Pyramids and the Great Pyramid,—and again, between all Pyramids and Tombs acknowledged or ordinary,—may be expected to be here introduced. They are as follows :—

‘ Respecting the particular purpose for which the
‘ Pyramids were designed, we have satisfactorily
‘ shown, in the foregoing inquiry, that they are ex-
‘ clusively *gigantic covers of rocky tombs*, built with
‘ great skill to bid defiance to the ravages of ages ; and
‘ that, as a general rule, they neither contain a sepul-
‘ chral chamber nor large apartment. The largest
‘ Pyramid is the only exception, owing, indeed, to
‘ particular circumstances which we think we have

‘to a certain degree explained. It is the only one
 ‘which contains two chambers, one of which served
 ‘for a tomb. Its construction, as well as the pains
 ‘bestowed on concealing and barricadoing all the
 ‘approaches to it, have been accounted for in refer-
 ‘ence to one single object—that of protecting the
 ‘hallowed corpses of the kings, as far as human
 ‘power and human ingenuity could do so, from
 ‘destruction. But how are we to explain their
 ‘having such an object? Were the hieroglyphics
 ‘complete, and could we thoroughly understand
 ‘them, they would not answer the question. The
 ‘idea which gave birth to these wondrous edifices,
 ‘one after the other, during a period of almost one
 ‘thousand years, in the deserts of Libya, is itself a
 ‘hieroglyphic, and a very mysterious one. Its inves-
 ‘tigation belongs to the fifth book.’

In the fifth book, accordingly (p. 651, vol. iv.), the subject is taken up again; and it is argued—that such an extreme desire to preserve the body safe in a stone monument, was connected with the belief of the Egyptians in the immortality of the soul; a belief which existed in their minds from the earliest times, but always accompanied ‘by a comfortless inability to embrace the idea in all its purity;’ in fact, they made the immortality of the soul rest on the due preservation of the body after death. ‘This was the tribute paid by the Asiatics, in earliest times, for the occupation of Africa and the possession of the Nile.’ ‘We assuredly owe,’ continues

the eminent philologist, 'the stupendous fabric of
' the Pyramids to a superstitious fear of the destruc-
' tion of the body, rather than to the mere vanity
' and love of display on the part of the builders.
' The judgment passed by the people on their kings
' after death (as upon every other person who died)
' was, at the epoch of the first dynasties, no empty
' form. Now the royal builders of the largest
' Pyramids were, according to universal tradition,
' haughty, cruel tyrants, who had good reasons to be
' apprehensive of the popular verdict, the ordeal they
' would have to pass at the hands of the people and
' priests. It was no easy matter for any one to find
' his way into the Pyramids; each of them had its
' own secret barrier to prevent intrusion; but, at
' all events, a forcible entry into them was quite
' impossible.'

Now this attempted explanation,—which we have extracted pretty fully, because it seems to be the highest and ultimate effort of all that mere philology, unaided either by exact science, or the principles of revealed religion, can do,—seems to our moderate apprehension to explain nothing of the innumerable exact structural features which are peculiar to the Great Pyramid, as different from the second and all other Pyramids. Nor, again, is it explanatory of the many particulars and methods of building, distinguishing all the Pyramids alike,—whether of kings reported tyrants, or lauded as philanthropists,—from the tombs proper of their own or subsequent times;

and in which tombs, the preservation, by concealment or barricadoing, of the mummied corpses was just as much attended to as in any Pyramid. Or, indeed, rather more so; for, in some instances, as in the *lined* entrance-passages of Pyramids, *they* tended to *lead*, rather than blind, subsequent depredators to the place of hiding of the precious corpse, deep under, or within, the mass of the covering monument. Nor does Baron Bunsen's explanation throw the smallest light upon the reason why, or by whose agency, the peculiar form of *Pyramids* first stood on the surface of Egypt; and wherefore the building of them ceased again after several centuries, without any alteration having occurred meanwhile in the national faith,—respecting the soul's life being dependent on the dead body's preservation.

Even under the learned author's section of 'Arts,' p. 654, the immense generic difference between the *decorated* tombs and *undecorated* Pyramids is positively ignored; as in the following passage,—'The interior of the tombs, *and in particular of the Pyramids*, exhibits the most striking example of the grandeur of the style of the old empire, and of its artistic perfection.'¹ And when the very ex-

¹ In his *Expedition to the Euphrates*, vol. ii. p. 88, Colonel Chesney intensifies all these errors, thus—'The compartments of the *Pyramids* and temples of Egypt exhibit, in colouring still vivid, the history and occupations of the inhabitants of the valley of the Nile.' But in that volume, in place of giving any account of his actual expedition, the Royal Artillerist attempts the whole history of the world, from Noah to Napoleon Bonaparte, and a little later; and cannot therefore be an original authority upon everything introduced.

tensively read author proceeds, with the view of making the too much neglected actual features of the Great Pyramid clearer after his manner,—not by ascertaining what they are by measures of line, number, and angle,—but by comparing them, in hazy and elastic allusions only, with something still less known, viz., ‘the architectonical form of the ‘vastest edifice in the world, the Temple of Belus, ‘as the watch-tower of Babel;’ we must really beg to decline following his grandly expressed, though mistifying philosophy any longer.

If, indeed, we *could* compare the details of the Great Pyramid exactly and certainly with those of the Tower of Babel,—great would be the advantage to knowledge; but whereto shall we look for certain and accurate particulars of the latter building? Of the Great Pyramid we have, even in this our own book alone, plans and sections, with three hundred pages of numerical observations of lines and angles taken on some most exact surfaces; and we have seen and touched and do testify of these things ourselves. But not one page of such features regarding the Tower of Babel, does the philological philosopher venture to bring forth to his readers; or even to assert that he has in his private possession; or to indicate where in the present state of the world, travellers may proceed and measure such documents for themselves.

In the Rev. George Rawlinson’s *The Five Great Monarchies of the Ancient Eastern World*, the foun-

dation plans of all the oldest Chaldæan temples yet examined on the lower plains of the Euphrates (the *supposed* region of the *site* of Babel), are stated to be invariably oblong rectangles,—the sides being in the proportion of three to two nearly,—and not squares like the bases of the Great, and other Jeezeh Pyramids. Further and more remarkably still, it is the *angles* of all these Chaldæan buildings, never their *sides*, which are presented to the four cardinal points;¹ so that they are as different from the Egyptian buildings of Pyramidal ages, in the important feature of azimuthal emplacement, as it is actually possible for them to be. In elevation, there was likewise a characteristic opposition; for the culminating height of a Chaldæan temple was always towards one end, and never vertically over the centre of the base, as with every Pyramid in Egypt: and such culminating part was an open chamber in the former, and a solid mass of masonry in the latter description of building. The former was moreover left in successive stages, usually three in number, and the lower one—rough with protruding buttresses; while the latter, or the Egyptian Pyramids, had all their temporary building steps filled in and bevelled off finally, smooth and sloping outside from top to bottom, in one vast sheet by the agency of the casing-stones.

¹ 'The angles of the building exactly face the four cardinal points.

² According to Mr. Loftus (*Chaldaea and Susiana*) this emplacement is observable in all edifices (temples?) of true Chaldæan origin.—G. Rawlinson, vol. i. p. 96.

Hence if there should be some points about the Great Pyramid, which we cannot examine very precisely there, by reason of dilapidations,—we shall certainly not clear up *those* difficulties by going to such completely alien forms of building as any, or all, of the Chaldaean temples that have come down to our times. Structures entirely peculiar are these in the matter of their materials also; which were so wretched and perishable, as to offer now little more than shapeless mounds, though of an age apparently long subsequent to the Great Pyramid. But the Great Pyramid again must be long subsequent to the Tower of Babel; so that the last clearly recognisable remains of *that* building, if composed in its day of the ordinary Chaldaean materials, must have perished, or ‘altered,’ very long ago indeed.

Evidently, then, an immense amount of faith is demanded of his readers by Baron Bunsen, when he has no modern-tested facts, to go on, in building up either a theory or a tower. While, on the contrary, he as despotically requires his followers to ride callously over well-ascertained and measured data; and show themselves impervious to belief when an astronomical explanation is rendered of some, even of the most undoubted facts, or features actually existing, in the Great Pyramid; and forming the *ipsissima verba* of its own contemporary account of itself. For all such explanations and even the things themselves, he stigmatizes, as ‘groundless ‘fancies,’ flagitiously *indulged in*; (p. 293).

Research de novo.

There is a most depressing feeling, when one first makes the discovery in life, that those whom we have long implicitly followed hitherto, and respected for their years, station, and higher attainments, their more extensive knowledge, and greater strength of mind,—have *not* the spirit of justice within them. There is no other choice then, but to set forth on one's path in the world—solitary it may be, and for certain with distressed mind and increase of labour with painful toil,—but willing to incur all, rather than be found voluntarily and knowingly opposed to any right moral principle. With some such sense of depression on our spirits do we commence this humble attempt, to investigate scientifically the origination of the Great Pyramid; cheered only with the assurance, that it cannot be wrong to attend to actual facts.

Amongst these may *first* be noted, that all the older Pyramids, as monuments,—call them funeral monuments if you will,—have amongst themselves a general community of figure and an absence of internal decoration; making them, as a class, stand wide apart from the ordinary Egyptian tombs,—which possess far other external figures, with most showy and adorned interiors.

Second, this peculiar class of monuments, the Pyramids, flourished only in the earlier, indeed in the very early, dynasties of Egyptian history; and had disappeared completely, in favour of other

forms, long before the nation of Egypt reached its culmination of empire, and peculiarity of institutions both public and private. Indicating, therefore, that the idea was not a natural one in the Egyptian mind, growing with its growth and strengthening with its strength; but rather an exotic,—which, received from abroad at the very beginning of the national existence, did at every succeeding architectural reproduction lose so much of force, or interest for the people, as at last to die out amongst them altogether.

Hence, to ascertain what chiefly characterized Pyramids when they were best understood or most appreciated amongst Egyptians, we should not visit the latest,—expecting there to see necessarily an accumulation of all the excellences of its predecessors; but should rather,—either search for the oldest; or, with more freedom from all foregone conclusions, seek out by mechanical inspection the most perfect and complete in its original design, and investigate its age afterwards.

Now, simply as tested by modern scientific measure, there cannot be a moment's doubt that as respects size, excellence of masonry throughout, and possession of internal chambers high up in that masonry,—replete too, with very remarkable proportions, and what may be called Pyramidal numbers,—the Great Pyramid stands before all the other known Pyramids. For notwithstanding that some authors claim for the second Pyramid, that,—

though rather smaller and very badly built,—it had a bordering of *coloured* granite round its base ; and others for the third Pyramid, that,—though very much smaller again,—it was coloured gorgeously for more than fifty feet up its side ;—still these things are deviations from the pure Pyramid principle, and show endeavours to modify it by the introduction of just so much of ornamental tomb or temple architecture. We may fortunately too, trace up the gradual increase, with time, of this parasitical, but truly Egyptian growth of luxury extending itself over the ancient pure form,—by looking at Lepsius' views of the Pyramids of Meroë. For these are *very* modern resuscitations of the old Pyramid idea, after it had been left alone for two thousand years ; and are found, though quite trifling in size, yet furnished with channelled and fluted corner lines, appended porticos, and outside sculpture in the intervening Theban-temple manner.

The Great Pyramid is thus, taken all in all, by far the largest, best, and truest Pyramid of all the Pyramids. How long then was required, let us therefore ask, for the idea of a Pyramid after its first invention, or introduction to Egyptian minds, to grow, improve, and fructify up to that point of transcendent excellence, whence they could build the *ne plus ultra* of that species of monument, or, the Great Pyramid ?

Then comes the very strange answer from Dr. Lepsius (see pp. 364 and 365), that he believes the

Great Pyramid was the first built of all Egyptian Pyramids, and was even the first of their public buildings of any kind; and that he cannot refer positively to any remains of the Egyptian nation of higher antiquity.

This opinion is indeed not yet allowed in full by *all* authorities: though none venture to put more than two or three items of known remains, and these immediately preceding it, earlier; so that the Great Pyramid, if not the very first, was very nearly the first work in point of time; and absolutely the first in time and excellence combined, of all the buildings ever erected by the Egyptian race,—at the strangely sudden beginning which their national existence once experienced on the banks of the Nile. (See p. 371.)

Hence we are driven back again, by the, in a manner, negative testimony of all monumental remains in Egypt, upon the theory of a Pyramid having been, as before expressed, an exotic to the Egyptian land. The idea was inserted there, evidently in vigour the most extreme and extraordinary,—because it was able to produce, even at the origin of the nation, a monument which, for size, style, and rank, has never since been equalled in any country on the face of the earth; had no known prototype in any other country; and has remained through ages, even of continually growing numbers of the human race, of increasing size of nations, and accumulating wealth of governments,—the emphatic

and chief wonder of the world. The idea, too, was inserted so deeply in the Egyptian mind, that for many generations it was never entirely lost; and Pyramid-building,—though in continually-decreasing scale, and for some other purposes,—with very rude, and often entirely mistaken or ignorant imitation, only, of the original,—went occasionally on.¹ But this again confesses that the idea never grew; and, like a full-blown flower cut from its parent stem, it began to decay from the moment it was planted into a new and unaccustomed soil.

Pyramid idea, whence derived?

If the idea, then, was exotic in Egypt, where did it come from?

At present there is no clue; for though there are now occasional Pyramids and Pyramidal buildings in several other countries of the world, they are all held to be far inferior in age, as they certainly are in character, to the Great Pyramid, and could not

¹ That the Egyptians themselves did not understand the meaning of the peculiar proportions introduced into the Great Pyramid, has already been shown in Divisions I. and II., where neither the angle of the outside slope, the length of a side of the base, the number of construction-steps, the commensurabilities of the coffer, nor any other points which have been shown to have been endued with a remarkable meaning in nature or art,—were ever again realized. Nor attempted to be realized,—for there was abundance of manual skill to have done it, had there only been brains enough to decide what the hands were to be employed upon.

More strikingly still do the hieroglyphics show the want of appreciation in the Egyptian mind. For look at our Plate XII. (all whose excellences depend on Dr. Lepsius' drawings), and see how the characteristics of hawks, owls, ibises, geese, hares, etc. etc., are lit off with a



Figure 1. Relationship between number of trials and number of correct responses.

Figure 1 shows the relationship between the number of trials and the number of correct responses.

Figure 2 shows the relationship between the number of trials and the number of correct responses.

Figure 3 shows the relationship between the number of trials and the number of correct responses.

Figure 4 shows the relationship between the number of trials and the number of correct responses.

have originated it. All, therefore, that we can venture upon now is, to continue our mere mechanical investigation by inquiring further, if facts permit,—and whoever the real originator may ultimately turn out to have been,—whether his whole intention or purpose in designing the Great Pyramid, was fully subserved in having that *one* monument erected on his plans by the Egyptians in their Siriadic land; or whether any of the subsequent Pyramids were necessary parts of the scheme to be filled in afterwards. How this inquiry is to be efficiently carried out, presents many difficulties; but our first proceeding must evidently be, to concentrate our attention on the numerous mechanical refinements and speaking, though uninscribed, walls of the Great Pyramid.

Now we have already both in this work, and elsewhere,¹ endeavoured to bring into notice the many confirmations, arising from recent measures, to the not new idea of the original purpose of the Great

line or two put in with consummate skill, and turned with admirable truth and meaning. But then look at the little Pyramids in the same Plate, and see what *angles* they have got. By John Taylor's theory we are taught that the angle of rise of the Great Pyramid's side is the all-important feature which it possesses; and that a difference of a few seconds, on one side or the other from $51^{\circ} 51' 14.3''$ would entirely spoil its meaning. An able artist, therefore, if pervaded by this truth, would endeavour to give that angle *nearly*, when representing the Pyramid;—yet we find by measurement, on Plate XII., that the angles of rise of the sides of three Pyramids attributed to Shofa, are on the paper = 72° , 72° , and 74° ; of two given to Shafre = 70° and 74° ; of one to Userchres = 74° ; and one to Tancheres = 76° !

¹ *Transactions of the Royal Society of Edinburgh*, vol. xxiv. Part II. pp. 385-403.

Pyramid having been, to serve as a metrological monument,—which was to testify, for some unknown reason, but through many thousands of years, to a particular system of weights and measures for all subjects, and on a very grand scale. And seeing that the various mechanical features which we have adduced in Divisions I. and II. of this volume, as typifying these things,—are all of them directly connected with, or do actually form the radical laying out of the foundations, and, so to speak, the bones of the building,—they must have *preceded* the employment of any of the subsequently built and fitted-up parts for any purpose whatever.

Hence it is no objection to the metrological theory, as that of the origination,—if a mummied corpse *was* latterly deposited, either in the King's or Queen's chamber, the subterranean, or anywhere else throughout the Pyramid; nor whether the coffer in the former, when opened by Khaliph Al Mamoon, was either absolutely empty, or filled with gold pieces of large size, or occupied by the body of a man with a golden breast-plate, a sword of inestimable value by his side, and a carbuncle shining with the light of day on his forehead,—each of which stories has one or more Arab historians to vouch for its conflicting truth and superior credit. Neither is it of any importance now, when both the gold and the man, his sword and the carbuncle, if ever there, are all long since gone,—whether they had been deposited in that place by the first builders

of the Pyramid or by Mencherian, Saitean, or Amosian fanatics, breaking into the Pyramid, and employing it for their own purposes, in the fifth, sixteenth, or eighteenth dynasties,—for the emptiness of the coffer is all that remains: while the fractured ramp-stone over the well-mouth, indicates that *some one*, entering forcibly by the well from the lower subterranean passage, must have burst into the upper parts of the Pyramid, and worked his will there in minor matters, long before the time of Khaliph Al Mamoon and his horde of Muslim excavators.

The intervening experiences of the Great Pyramid are indeed vastly more difficult to investigate, than its present or primitive state; and, happily for our problem, are of little importance. For such intervening effects have always been in the way of petty degradations and mischief, never with the view of adding to, or improving, and certainly not of building up again from the very foundation; so that the work of later men can be easily distinguished from those of the original builders.

We put the metrological hypothesis, therefore, upon its trial for the explanation of the *original* Pyramid form, proportions, characteristics, and requirements; and find that for it, the Great Pyramid by itself, as actually erected in *geographical position* in form and parts, but without artistic ornament inside or out, is admirably suited and perfectly sufficient. Find also, that if executed once in a thorough manner, there need be no further repeti-

tions of it,—so far, at least, as its successful interpretation is concerned; though for the purpose of shielding the one precious monument from barbarous mischief during long ages of war, invasion, and revolution,—a number of successive, nearly similar in appearance, though for the theory, or for practical metrology, really valueless Pyramids,—might be considerably useful. And find also, in actual measurements of the building, the long series of coincidences working, as already detailed, into coincidences,—which terminate at last in showing that the Great Pyramid actually is a containing case or setting for a grandly complete system of metrology,—adapted to everything connected with size, weight, heat, angle, and time,—all on one uniform and admirable system of referring to the most influential and wide-spreading features in nature for the value of its standards; and expressing these in the neatest and most convenient arithmetical forms of one constant order of numbers.

That such a metrological system *should* be contained in the Great Pyramid is no doubt a surpassing wonder; but having been proved for it by all the preceding pages of our work in vol. ii., and Divisions I. and II. of vol. iii., and never having been made out for any of the other Pyramids in the smallest degree,—we obtain a complete solution of the particular question just proposed. That is, we find that the scientific scheme of origination does not depend for its full expression on any of those other

and subsequent Pyramids of Egypt, but is complete and perfect in the Great Pyramid taken by itself, and resting upon itself alone.

Hence comes the encouraging conclusion, that for the still further prosecution of all the really important parts of the mystery in a scientific point of view,—our attention and studies may be concentrated entirely on the Great Pyramid ; and then the higher and more difficult personal question comes up again with greater force than ever,—viz., Who was the originator ? Nay, who *could* have originated such a building ?

Wisdom of the Egyptians fails.

Many worthy persons imagine, in an indefinite manner, that the science of the ancient Egyptians was something of infinite power and scope. They, the Egyptians, had a particular deity, it is further contended, to preside over weights and measures ; and, *therefore*, if it be admitted,—as admitted, we conceive, it must be, both from the discovery of the quarry-marks and of superficial traces of the use of the cubit of Memphis,—that the Great Pyramid was erected by *the hands* of Egyptian workmen, while it stands confessedly to all on Egyptian territory—why go further, say these excellent and well-intentioned modern men, than to Egyptian learning, for the origination of the scheme ?

The answer is twofold—*First*, if the system had been altogether Egyptian, and Egyptian means had

been employed knowingly and purposely in commemorating it by so expensive a structure as the Great Pyramid,—how is it that not a single element of the system was ever used by Egyptians at any time of their history, early or late? For whenever we can ascertain at any period of their empire what their standards were in length, weight, angle, or time, they are perfectly different,—as already dilated on sufficiently, both in the last volume and the present one,—from those of the Great Pyramid. And *second*, let us test the depth and quality of this mysterious learning of ancient Egyptians, and which a special god in their pantheon was appointed—by themselves—to assist them in.

In our attempt to give a fair abstract of their history from dynasty four to dynasty twenty, in chapters v. and vi., we have certainly not come upon much of the learning. But as *our* testimony may be objected to on principle, we prefer in this matter to appeal to Chevalier Bunsen; whose pro-Egyptian tendencies crop out so vehemently towards the end of his world-famous volumes,—that all men may rest perfectly assured in finding in him, the utmost that can possibly be said with any regard to propriety, in favour of the respectable appearance of ancient Egypt.

Now this deeply learned and very favourably inclined Chevalier Bunsen, when summing up the final statements near the end of his fourth volume, or p. 658, expresses himself thus, under the heads of

‘Geometry and Astronomy,’ and in so doing he is including everything that can be said not only for the Egyptians of the fourth, or Great Pyramid building, and earliest monumentally proved, dynasty,—but for those of every other dynasty likewise: ‘Their knowledge of mechanics and of the cognate mathematical principles is evinced no less by the artistic perfection of their buildings, than by the vastness of their masses. But this will not justify us in supposing them to have possessed a really scientific knowledge of these subjects. It was ingenuity, based upon a keen natural perception, guided by the elements of geometric science.’

‘Their astronomy, like everything Egyptian, was strictly provincial, and calculated only for the meridian of Egypt.’

This last sentence is indeed final, and is almost worthy of either W. Osburn or M. Renan, in the felicity with which it fixes on the grand national characteristics of those *quasi* ‘Chinese of the earlier ages of time, to whom Egypt was the whole world, and within the limits of whose Egyptian valley, their ideas were entirely confined.’

Another equally favourably disposed author to the Egyptians, M. Brugsch, writes, in his History of Egypt:—‘Astronomy was not amongst them (Egyptians), that mathematical science which calculates the movements of the stars, in constructing the grand systems which compose the celestial sphere. It was rather a collection of

‘notes of phenomena, periodical to the sky as seen
 ‘in the Egyptian country, and of which the reciprocal bearing could not long escape the eyes of
 ‘the priests, who observed, in the clear nights of
 ‘Egypt, the brilliant constellations. Their astronomical knowledge was founded on a base of
 ‘empiricism, and not on that of mathematical
 ‘observation.’

While if we appeal to old Greek and Roman testimony, we are told ‘that Strabo admitted that the
 ‘Egyptian priests of his own day were destitute of
 ‘all scientific and astronomical knowledge;’ and, more searchingly still, that ‘the science of Egypt,
 ‘like the wealth and power of Persia, was found by
 ‘the Greeks to be a nullity, when it became the
 ‘subject of certain knowledge and observation.’

Such a people, then, as this of Egypt, never really scientific, ‘never with minds sufficiently
 ‘trained in abstract reasoning to be able to follow
 ‘the demonstrations of the conic sections,’ and always cooped in their narrow valley, with their narrower opinions and exclusive ideas,—could have had no notion of founding their linear standard on the earth’s axis of rotation; their weight and capacity measure on an employment of the whole earth’s mean density; a temperature standard on the mean surface-temperature of the whole earth; and their time standard on the precession of the equinoxes, assisted by meridian observations combining a well-chosen polar, with an equatorial, star.

The notion of Egyptians having done this, is evidently absurd beyond all the usual bounds of absurdity; they could not have done it, and we must look elsewhere for the habitation of the originator or planner and well-nigh perfect carrier-out of so remarkable a scheme.

But in that case whereto shall we look? for Bunsen, Renan, and others discourse eloquently of the Pyramid-building age of the Egyptians, being a period when that nation was the one and only community of cultivated and civilized men, descending in their one and solitary bark the mysterious stream of time; whose current was then unploughed by any other keel. At the date of the Great Pyramid's building, too, or 2170 B.C., all the peculiarly so-called 'wisdom of the Egyptians,'—in reality, their more recondite idolatrous mysteries, with statecraft and handicraft,—had not begun. For, on referring to vol. ii. p. 435 to 438, it will be observed, that some exceedingly zealous friends of old Egypt, do not attempt to place the invention of the feast of the Isia, earlier than 1350 B.C.

Even too, though we descend that stream of time to epochs when the Egyptian vessel of state, was hustled by the rival appearance there of the Assyrian, Babylonian, Persian, Grecian, Phœnician, and other nationalities,—Egyptian astronomy was no better than what has been described above; and we shall have to descend very much further still down the course of ages, even to within a few years

of the present year of grace, 1866, before *any* human science will be found competent to have arranged and represented so full, philosophical, and perfect a metrology as that of the Great Pyramid.

Who, then, could have been the originator of that system; and in the day of the Great Pyramid, or when the particulars *were* actually inserted into that building; by the hands of Egyptian workmen no doubt, but without their knowing what they were doing; and when no real physical science existed anywhere in all the world?

Something beyond the usual ken of man, and even above the power and scope of science to grapple with, must have been here concerned (these facts would seem to imply). And the late John Taylor had come to the conclusion,—before he knew more than a tithe of the evidence which the Great Pyramid has since then proved itself capable of yielding, when properly examined by measurement,—that this wondrous monument of old had been built under the direction of chosen men, *divinely inspired* with wisdom from on high for that purpose.

Necessity for seeking a wisdom higher than man's.

Such an origination as that, would of course, if real, instantly relieve the question of all its human impossibilities. But the mere naming of it, in the present day, before scientific men in a scientific subject, and connected with practical facts,—is greeted immediately with a storm of clamour, re-

proaches, regrets, objections, and the most determined opposition. Not without some reason too,—because the attribution of a Divine origin, when men find anything either in science or early history, above their immediate power to explain on simple principles of human learning,—has been hitherto generally, if not always, a sign of weakness in the science of those employing it: so that the progress of natural philosophy in recent years, contains not a few cases of phenomena, once thought supernatural, yet now shown to be amenable to mechanical principles, as well as following implicitly the regular order of nature.

Let us therefore, by all means, attend to, and weigh carefully against the facts already accumulated on our side,—for we cannot drop them on account of mere clamour,—all the explicitly stated objections by able men that we may be enabled to meet with.

First amongst these, must be placed the opinions of men understanding mathematics, mechanics, and practical science. And they, after having examined the numerical admeasurements as given in vol. ii., and discussed in the present volume,—are usually ready enough to allow that a metrology, as alleged, is there indicated. They are then only taken up, with how its introduction can be attributed to something else than Divine inspiration.

Thus says one friend, of much learning after this kind, ‘The capacities of the human mind, in special instances, are marvellous; and a single great genius

‘ might think out a whole system of mathematical
 ‘ science in the course of a short lifetime ; and then
 ‘ you might have from him some truly wonderful
 ‘ publications, although the nation he belonged to,
 ‘ and in the midst of whom he lived, knew nothing
 ‘ whatever about mathematics either before or after
 ‘ his day.’

To this our answer is twofold :—*First*, according to the very independent testimony of M. Renan, there was never a particle of genius in the whole land of Egypt. ‘ Egypt,’ says he, ‘ was of all countries the most conservative. Not a revolutionist, not a reformer, not a great poet, not a great artist, not a *savant*, not a philosopher, is met with in its history. In that sad valley of general mediocrity and eternal slavery, men vegetated for thousands of years, they cultivated their fields, they made good overseers, they carried stones upon their backs, they lived on very contentedly without glory. One and the same level of mediocrity pressed upon every one.’ *Second*, even if there had been such an amount of genius in that dull land, for *abstract* science, or science that can be thought out within doors, and even within the walls of a dungeon, as would have amounted in all actual experience, even in lands most favoured by genius and caprice of Nature, to a miracle in itself,—the mixture on the other hand of *practical*, with *abstract*, science, which is requisite for finding out the several features of the earth as employed in the Great Pyramid

metrology, is not an affair of the mind alone, but of the general progress of all the arts and sciences of a great nation,—combined with much travelling about; and extensive and accurate observations of various kinds, over a large part of the earth's surface, even from the pole, or its neighbourhood, to the equator; and round about the equator again in many different longitudes. And how could the earlier Egyptians accomplish all that, confined as they were in their narrow valley?

Another friend of the same order of knowledge then suggests: 'Grant that the *Egyptians* never could have conceived such a metrology as that of the Great Pyramid,—but why should there not have been nations,—nations whose names we have never heard of,—living long before the Egyptians through many thousands of years; attaining by degrees to more knowledge than we possess at present; flourishing for long ages as we have never flourished yet; but finally dying away, and leaving no other trace of their once existence upon the earth, than this single Pyramid, which encloses so much knowledge?'

To this we reply: 'that if they did live once, the Great Pyramid is not their work,—for the quarry-marks prove it Egyptian of the fourth dynasty; or decidedly, though only just, within recognised Egyptian history. And as to these or any other supposititious nations performing such great deeds through unchronicled thousands of years, and yet

'leaving nothing behind them, even in the land of Egypt,—where Bunsen, Lepsius, and Renan all tell us "*that nothing decays*,"—we have become so accustomed to sound, tangible, and practical proofs, as well as sterling material evidence, in our Great Pyramid investigations,—that without something of the same hard kind being brought up in favour of the unknown and unnameable, theoretic, civilized, and powerful nations long since passed away,—we decline to believe that any one of them ever existed.'

Next come the objections of men who do *not* understand mathematics, mechanics, and practical science, but are supposed to be strong in mental philosophy and some other subjects; and these individuals mostly refuse to allow that anything connected with metrology has been, or can be, proved, by measures taken at the Great Pyramid. Their reasons appear to be, that all practical sciences are over-ridden by logic and metaphysics, which both fix the bounds within which the others can be usefully employed, and have given forth this dogma, that *no number of coincidences makes a proof*: therefore, say they, no number of agreements in the measured proportions of the Great Pyramid, with earth-features, can ever establish that there was an intention of the founders to typify such things,—much less to arrange a whole scheme of metrology upon them.

Seeing, however, that the Great Pyramid is a

practical matter, the said logicians and metaphysicians may be referred to that very frequent illustration, a watch, and a good watch keeping time to a second a day ; and asked,—whether the world at large is likely to accept their dogma practically applied there. Or, that all the numerous coincidences of the watch's wheels and pinions working exactly into each other, and the agreement of the resulting hour-hand's indications with the rotation of the earth on its axis, to such extreme closeness as only to be 1-86,400th in error—special means being also introduced to prevent changes of temperature spoiling that close approximation—that all this forms *no proof* that there has been any intention on the part of an intelligent watchmaker to produce such coincidence !

Lastly, but more numerous, come men, not exactly classifiable under either of the previous heads ; but so confident, nevertheless, in the teachings of their own sciences,—which require time almost illimitable for their operations,—that they refuse even to look at the Pyramid subject at all. An eloquent expression of the views of this party, as given by a master amongst them, is contained in the address of the President of the British Association at Nottingham, and runs thus :—

‘ Can it be supposed that the inhabitants of Central America, or of Egypt, suddenly, and what is called instinctively, built their cities, carved and ornamented their monuments ? If not, if they must

‘ have learned to construct such erections, did it not
 ‘ take time to acquire such learning, to invent tools
 ‘ as occasion required, contrivances to raise weights,
 ‘ rules or laws by which men acted in concert to
 ‘ effect the design ? Did not all this require time ?
 ‘ and if, as the evidence of historical times shows,
 ‘ invention marches with a geometrical progression,
 ‘ how slow must have been the earlier steps ! If
 ‘ even now, habit and prejudice resulting therefrom,
 ‘ vested interests, etc., retard for some time the
 ‘ general application of a new invention, what must
 ‘ have been the degree of retardation among the
 ‘ comparatively uneducated beings which then
 ‘ existed.’

To this excellent piece of writing, however, we may answer,—that it does not attempt to prove anything, directly, of what actually took place at the building of the Great Pyramid ; it merely infers what *ought* to have occurred there, according to what is seen now to take place amongst men, whenever an opportunity occurs for positive observations. In so far, then, it represents only, but truly, the deductions of science as to whatever characterizes a purely human beginning ; for whether among the modern European nations, or the ancient Greeks, or any other people within historical limits, their beginnings, both in astronomy and architecture, have been invariably marked by long wanderings in littleness, rudeness, and puerility alike of conception and execution ; accompanied, indeed, by some

tendency to enlarge or advance, but developing itself so slowly in their earlier years, as to be quite invisible except with the long lapse of ages.

This then is, according to the growing and influential school represented by a large portion of the British Association for the Advancement of Science, *first*, the real characteristic; and *second* (when it is found to have actually occurred anywhere), the scientific proof, of a human beginning. And if so, what follows when we come to the Great Pyramid, and find that its actual mode of beginning (having been sudden, see p. 370, etc.) was perfectly different from all the alleged characteristics of a human beginning,—as comprehensively, powerfully, and truly laid down by the above-mentioned philosophers!

Nay what can follow, but the conclusion, resulting in a belief,—that the Great Pyramid was not altogether of human origination? And in that case, whereto should we look for any supernatural assistance to man, but from Divine inspiration?

If there were any other method whatever of solving the problem, than that of referring to *inspiration*,—or, if proofs were not multiplied on proofs to show that this case of the Great Pyramid, is the most remarkable instance ever submitted to the investigations of science, and is as true and certain as it is old and venerable,—we should have been the last persons in the world to have dared to propose (or to adopt when others proposed it) a mode of solution so awful to contemplate, so dread to

appeal to lightly, and so little instructive if used without reason. But, as we have already shown, there is no other conclusion possible with the facts.

Science, then, leads the case up, nor can it do more, to the boundary line, bordering only on religion. So that if we would next endeavour to ascertain whether, after being brought so far, the subject can really be admitted within that hallowed pale,—recourse must be had to trials and examinations of a very different order.

CHAPTER VIII.

ORIGINATION OF THE GREAT PYRAMID, ON RELIGIOUS GROUNDS.

No sooner have we satisfied the scientific objectors (as we trust has been done in the last chapter) that the manner of appearance and nature of contents of the Great Pyramid, are not according to a merely human beginning,—and that some assistance from the Deity *must* be looked for,—than we find ourselves assailed by many well-meaning and religious-minded persons, for presuming to look to such a source in such a case, example, or cause.

Assistance, direction, instruction, in a word, *inspiration* from God to man, they consider to exist, or be possible, only in the light in which it took place upon the Apostles, and at a certain Pentecost. And being therefore an affair of the Holy Spirit in connexion with the highest mysteries of spiritual religion,—they, the religious objectors, consider it actual impiety for any one to talk about *inspiration* in connexion with giving any man or set of men directions about the size, proportions, and arrangements of mere masonry work,—even though

it should be for a building, so immense, so strong, and so enduring as to last all human time ; and in a cause connected with furnishing the metrological symbols of justice, and practical means of honesty, to all the nations of the earth.

We have listened patiently and respectfully to all these objections (some of which have reached us from friends in the southern hemisphere) ; but can only imagine that their upholders are imperfect readers of their Bibles ; and have read of, or remember,—which comes to the same thing,—only one class of cases of inspiration, viz., that most important one above alluded to ; and which is, in itself, precisely as they describe. But further reading in the sacred Scriptures would soon show, that it has pleased one and the same Almighty God to send His inspiration, at different times in the history of the world, for almost any, and every variety of purpose ; and sometimes for matters fully as material, and on a very much smaller scale, than those of the Great Pyramid. Else why do we find in Exodus xxxi.—

‘ 1. And the Lord spake unto Moses, saying,

‘ 2. See, I have called by name Bezaleel the son of Uri, the son of Hur, of the tribe of Judah :

‘ 3. And I have filled him with the spirit of God, in wisdom, and in understanding, and in knowledge, and in all manner of workmanship,

‘ 4. To devise cunning works, to work in gold, and in silver, and in brass,

‘ 5. And in cutting of stones, to set them, and in carving of timber, to work in all manner of workmanship.

‘ 6. And I, behold, I have given with him Aholiab the son of Ahisamach, of the tribe of Dan : and in the hearts of all that are wise-hearted I have put wisdom, that they may make all that I have commanded thee ;

‘ 7. The tabernacle of the congregation, and the ark of the testimony, and the mercy-seat that is thereupon, and all the furniture of the tabernacle,

‘ 8. And the table and his furniture, and the pure candlestick with all his furniture, and the altar of incense,

‘ 9. And the altar of burnt-offering with all his furniture, and the laver and his foot,

‘ 10. And the clothes of service, and the holy garments for Aaron the priest, and the garments of his sons, to minister in the priest's office,

‘ 11. And the anointing oil, and sweet incense for the holy : according to all that I have commanded thee shall they do.’?

This then is the kind of inspiration, if we may so allude to it, which we would seek for in the case of the Great Pyramid. Not, however, presuming to say of our own selves that it *was* exerted,—but merely venturing to inquire what points of similarity or contrariety there may have been between the many undoubted cases which are given us in the Bible,—and the circumstances of origination of the Great Pyramid, so far as known, and in the state in which its question has come to us,—after undergoing scientific examination.

Time of its performance suitable?

Now with these views, one of the first points to be discussed, respects the age of the Great Pyramid ; for, as a building, no matter for almost what pur-

pose originally intended, or for which of the many purposes hypothetically suggested at various times, and by various authorities,—it must be regarded as something verging much more on the material, than the spiritual. Wherefore, thence comes this precise point to be settled, viz.,—was the date of foundation of the Great Pyramid a period of the world's history when, *according to the Bible*, either directions were given, or instructions are reported to have been communicated, by God to man, touching the correct performance according to number and measure, of material work?

An examination of Scripture will soon show, that such subjects were dealt with more frequently in the earlier, than the later, parts of its history; and two special instances may be taken as including within them, if not the most eminent, at least a very marked period of inspiration having that character; these instances being, the construction of the tabernacle of Moses, and the building of the ark under Noah. In each of which cases the precise measures of length, breadth, and height to be kept to, were clearly announced by inspiration.

The date of the first-mentioned example has been abundantly treated of by many most able writers, on both scriptural and scientific grounds, and concluded to be certainly within the limits of 1600 and 1300 B.C.; or, as assumed in our chapter vi., with most probability of being close to 1320 B.C.; and no one doubts but that the Bible description there,

does really refer to work actually performed. But with regard to the date of the latter mentioned, though really prior example,—or the scriptural building of Noah's ark,—there is far greater uncertainty; not only by reason of science being unable to say anything whatever about the operation, its date, or even the thing itself,—but that different Biblical authorities differ by almost irremediable amounts of time from each other. By amounts, indeed, so large as to have assisted in a notable degree to fan a very general impression, now current in much of learned society, to the effect—‘that the first book of Moses is to be ‘looked on as of profound metaphysical import, but ‘not as historical, nor as dealing historically with ‘matters of fact;’ or, as others more distinctly pronounce upon the case,—‘both the Noachic Deluge ‘and the Tower of Babel are myths not to be ‘taken literally as matters of physical existence, ‘though undoubtedly embodying great psychological ‘truths.’

But this is not enough for our purpose of illustrating the case of a huge fact like the Great Pyramid. We must, therefore, make some little amount of examination as to the reality of what we are referring to; and, as a first step, should take up the discordances of dates amongst the Biblical scholars themselves. To be certain that this discordance really exists, the reader has only to look into any good compendium of Scripture literature on chronology, such as Kitto's *Cyclopædia* or Smith's

Bible Dictionary, for the date of 'the Deluge' (as something necessarily very close to the building of the ark); and he will immediately find himself entangled with disputes as to the relative trustworthiness of different versions of Scripture, the Hebrew giving one date, the Septuagint another, and the Samaritan yet another, each different from the rest by many centuries.

The upholders of the Hebrew version declare that the Septuagint early dates, obtained by summing up the patriarchal lives, were wilfully altered in the way of extension by the seventy of Alexandria, to make Bible dates more harmonious with Egyptian ideas of long chronology. But the supporters of the Septuagint, on the other hand, retaliate that the keepers of the Hebrew copies of the Scriptures altered them in way of contraction of time after the taking of Jerusalem,—so as to persuade men that the true Messiah of the prophecies must still be for to come; and they further assert that our Saviour and the Apostles in their quotations from Scripture, always used the Septuagint version. As for the Samaritan manuscript, no one of note seems inclined to pin his faith on that uncertain document: and the dispute as to the true scriptural chronological date of the Deluge, or any nearly synchronous event in the earth's history,—will simply go on to the end of the present dispensation in a series of assertions from one side for the Hebrew, and counter assertions on the other for the Septuagint

version,¹—unless, indeed, some new material data more exactly to the point can be discovered.

Evidence of such improved and additional kind would it be, could a copy of the Scriptures be discovered anywhere, capable of being clearly and indubitably proved to be older than the date of the Septuagint version; but such a relic, we believe, nowhere exists. A friend, recently returned from the Holy Land, was loud the other day in praise of an ancient copy of the Scriptures which he had purchased from some Jews there, under a peculiar combination of circumstances favourable to the production before Western buyers, of the oldest mss. still existing in the East. And when we therefore inquired eagerly respecting its absolute age, he went

¹ Out of numerous couples of opponent writers, we subjoin the following as a fair sample of the whole:—

(1.) ‘ . . . Our only real appeal is the Scripture. . . . And here, on * the great primary question of the *Patriarchal chronologies*, and whether * it be the *Hebrew text* with its shorter chronology, that has by fraud * been robbed of *eleven centuries*, or the *Septuagint* with its longer, that * has had them fraudulently added (for that the difference is the * result of design is a thing evident, and long since noted by Augustine), * the answer seems on every account to be in favour of the Hebrew * text.’—P. 255, vol. iv. of *Horæ Apocalypticae*, by the Rev. E. B. Elliot, A.M.

(2.) ‘The contracted scheme of the Hebrew text is rejected by the * greatest names in this branch of Biblical literature, as being glaringly * inconsistent not only with the records of other nations, but even * with the history of the ancient Hebrews themselves.’—Rev. J. R. Beard, in *Kitto's Cyclopædia of Biblical Literature*.

While the Rev. George Rawlinson, in his Bampton Lectures, delivered in the Oxford University pulpit in 1859, seems to refer to the Hebrew text for doctrine and the Septuagint for dates; the latter, too, he has so much confidence in, that he fixes without scruple the date of building the Great Pyramid more than a century earlier than the Deluge according to the Hebrew text.

off at first into a long account of the undoubted proofs he had obtained as to its superior relative antiquity to all other recently discovered mss. ; but concluded by stating, that he had submitted his copy to the examination of an *expert* in these things in Alexandria ; and the said skilled hand had rubbed the ms., and wetted it, bit it, and trode upon one corner,—and then pronounced it ‘genuine ‘beyond all doubt, and *twelve hundred years old.*’

For ability, however, to throw full light on the vexed question between the two chief modern versions of the Scriptures, a manuscript of at least 2500 years old would be required ; and proof also, capable too of being appreciated by ordinary men as well as *experts*,—that its writing had nowhere been tampered with in the interval ; and that the copy in question had been originally vouched for as to its literal correctness, if not actually written, by an authority of no less unimpeachable a character than one of the prophets capable of receiving the inspired messages themselves. And all that would be tantamount to a miracle in itself.

Yet—within its own order both of subject, and mechanical mode of construction for the expression of its meaning—the Great Pyramid has all these forms of vouchers for its authenticity ; and for dating not only from 2500, but from more than 4000 years ago. No one doubts but that the huge stones whose size, shape, and manner of arrangement and junction we can still examine, are, even

by means, or on account, of these qualities, the very *ipsissima verba*, in so far as they represent words at all, of the original builders. Wherefore, in any cause which could be so represented, and where a power of proving at long future times the minute accuracy of the original message, should be important,—there is evidently in practice a virtue in a builded monument like the Great Pyramid, which ‘no roll of a book’ ever has been endued with or practically can possess,—when it is known only by copies, from copies, and these from other copies again,—all of which, together with the original, are long since reduced to dust. And now comes, or will soon come, the question, whether advantage has been taken for true religion of that remarkable property of almost undying authenticability, residing in the former method of commemoration.

But our inquiries are now confined to the simple question to state,—though rather transcendental, to solve practically ; viz., that of testing one particular illustration derived from, and depending on the date of the Great Pyramid, by a proof to be derived from the Holy Scriptures : which latter, in their material form as they now exist among men, are far younger than the Great Pyramid, and infinitely more difficult to authenticate literally, verbally, and more especially, in their chronology.

In this last point of difficulty, finding my own knowledge altogether insufficient, I turned to ecclesiastical authority ; and after several fruitless or

unsatisfactory answers from smaller dignitaries,—applied at length officially to the representative head of the largest and reputedly the most learned Established Church in Christendom, viz., the Anglican—requesting to know what that Church had concluded, and did believe, as to the true *scriptural* date of the Deluge; and how far it approved of the dates inserted in the margin of many of the authorized copies of the Bible.

The exact terms of the answer very graciously accorded, almost by return of post, are subjoined:—

‘LAMBETH PALACE, S., 14th May 1866.

‘SIR,—In reply to your inquiry, I write to inform
‘you,

‘(1.) That the Church of England has assigned
‘no date to the Noachian Deluge.

‘(2.) That the Church has not fixed any dates
‘between which it must have taken place.

‘(3.) That the Church of England has not authorized the insertion into the authorized copy of the
‘English Bible of any system of dates.—I have the
‘honour to be, etc., (Signed) C. T. CANTUAR.’

After receipt of such a letter, there was evidently nothing to be done, but for ourselves to attempt an approximate discussion, of what might seem humanly likely to have been the original Scripture date of the Deluge,—from a comparison of the various results of different private workers in this most interesting and important field.

So far as we can gather the numbers, they run thus ; each result professing to be scriptural :—

Authorities.	Date of Deluge n.c.
Septuagint, Alexandrine (Kitto's <i>Palestine</i>), . . . =	3246
Jackson, =	3170
Hales, =	3155
R. Stewart Poole (Smith's <i>Bible Dictionary</i>), . . . =	3129
Samaritan (Kitto's <i>Palestine</i>), =	2998
W. Osburn (<i>Monumental History of Egypt</i>), . . . =	2500
Elliot's <i>Horæ Apocalyptica</i> , =	2482
Browne's <i>Ordo Sæclorum</i> , =	2446
Playfair, =	2351
Ussher, =	2348
Petavius (Smith's <i>Bible Dictionary</i>), =	2327
Mean, Years B.C., . . . =	<u>2741</u>

From all these various statements, then, what shall we conclude as to the real date of the one particular event which they each and all claim to chronicle ?

We have taken a mean of the whole, and it *chances* to come to 2741 B.C. ; but, being derived from numbers differing so exceedingly as 3246 and 2327, it can impart little confidence,—either as to the accuracy of the figures themselves, or, to what is more important still, the reality of the event alluded to.

The actual range of the numbers, however, suggests a rudely parallel character with the crucial epochs of Great Pyramid astronomy ; for the two occasions of α Draconis being seen in the direction of the entrance passage, or the years 2200 and 3400 B.C., evidently circumscribe all of what can be called the *Scripture* dates of the Deluge ; while the time

of the star's nearest appulse to the pole, or about 2800 B.C., approximates to the mean and most probable time of the occurrence as above obtained. Such a resemblance of mere numbers, would of itself, be of no kind of importance ; but the manner in which the dates are obtained, proved, and memorialized by the Great Pyramid's method of observing,—connects itself astronomically, in a very remarkable manner, with numerous widespread and apparently genuine, independent, and authentic traditions of the Deluge, not yet explained on any scientific hypothesis. And yet when they are at last examined by what we have here to offer from the Pyramid, they are found to contain astronomical truths of rather too recondite a character to have been alighted on by savage tribes of imperfect civilisation.

Now traditions of the Deluge, are undoubtedly rather too abundant in the present day ; and when one large work, presently before us, brings up with great rejoicing ' the celebrated Apamean medal,' struck in the time of the Roman Emperors ; and another equally ponderous volume discourses largely of Mohammedan traditions,—which even give what the people of the land said to Noah when he was building the ark, and what he replied to them in return,—we object to such traditions entirely, because without any proof that they existed in the world until long after the dissemination of the Hebrew Scriptures among those very peoples and countries.

But *some* of the annals of the Chinese, some of

the Egyptian writings, some of the foundations of early Greek beliefs, some Chaldaean inscriptions, and by an inference of pretty sure character, *some* of the practices of Mexicans, Peruvians, Fijians, Australians, and other New-World savages whom Greece and Rome never knew,—these are free from the accusation of possibly being founded in latter times on the Hebrew Scriptures. And when they all alike tell nearly the same story, they must allude to something founded on very broad, solid, and ancient foundations ; or, in other words, on truth and fact of a most cosmopolitan kind.

Amongst such traditions, then, which we must respect,—and a few of which are contained in the quotation from Mr. Haliburton in vol. ii., pp. 380 to 448,—there are not only traces of a belief in there having been a Deluge, destructive to the human race, but in there being some connexion between its cessation and the stars of the constellation Taurus. Why this should be, the traditions and their collectors say not ; they are only certain of the fact ; and of the stars in Taurus being therefore associated with ‘sweet influences,’ and favourable to mankind. Wherefore, we take up the case at that point ; and suggest, by the light shed on the subject from Great Pyramid astronomy, that this is in the direction of being a reason :—

Compute for the lower limiting date, or 2200 B.C., when α Draconis was *last* seen in the direction of the entrance passage of the Great Pyramid,—and

when, both traditionally and scripturally, the dangers were over, and evil effects of the Deluge all subsided,—compute, we say, what equatorial and zodiacal constellation was on the meridian above the pole at the instant ; and, as abundantly described on pp. 279, 283, it was Taurus and the Pleiades.

But compute for the upper limiting date, or 3400 B.C., (*i.e.*) Pyramidally the penultimate occasion when α Draconis was similarly seen in the same angular direction from the pole,—and when both traditionally and scripturally the threatened punishment of the Deluge was impending over the human race,—and, as indicated on p. 277, the equatorial and zodiacal sky was as diverse from the epoch of 2200 B.C. as anything can be under the whole heaven ; for Taurus and the Pleiades were *nowhere* visible, while Scorpio and Serpens occupied the dominant position.

For almost any period, moreover, previous to 3400 B.C., Scorpio and Serpens were nearly similarly dominant,—just as for ages after 2200 B.C., Taurus and the Pleiades were also, as at that epoch, the generally dominant stars ; and characterized post-diluvian, just as essentially as the former stars expressed antediluvian, times. But they did this only through means of that most peculiar feature of the Great Pyramid astronomy,—a feature most certainly known to exist, though entirely neglected by modern astronomers hitherto,—*viz.*, the feature of the Pyramid visibly memorializing its polar star *only at its lower culmination*. We, however, having attended

to that clear principle of the builders connected with the lower, and not the upper, culmination,—have obtained for the earlier time-limit, something that seems to explain the maledictory names so generally bestowed by all early Eastern nations on the stars in Scorpio and Serpens; and for the later time-limit, an explanation of the rejoicing, fond, and grateful epithets similarly applied to the stars in Taurus.

But what shall we obtain, on similarly computing for the middle epoch, or that of α Draconis being at its closest proximity to the pole (yet still not at the pole, and therefore having a circumpolar daily circle, though an exceedingly small one, to describe, and with an upper and lower culmination, in principle as before); *i.e.*, compute for 2800 B.C., which is so nearly the mean of all *scriptural* dates of the Deluge itself, as to come within sixty years of it? Why, this is what comes out,—that when α Draconis was *then* crossing the meridian below the pole, the zodiacal constellation crossing the meridian above the pole was Aquarius! At that very date, the meridian line crosses the mouth of the water-pot whence the stream is issuing; and thence, in the course of a short time, traverses through the water-stream; next, the constellation of Pisces, then Aries, and finally—at the *marked* period of the Pyramid, or 2170 B.C., or when α Draconis was $3^{\circ} 42'$ from the pole,—is found as already detailed in Taurus. Not only so too, but the Pleiades seems to

form almost the *limits* of the movement of the meridian opposite to *a Draconis*; so that that circle must have hung on those stars, as it were, almost inalterably for ages near to and about the year 2200 B.C.; and then have begun only slowly to retrograde, even as it is doing now.¹

So here, we have a series of genuine early traditions, rendered in a manner vocal, or endued with a meaning, through the agency of ideas embodied in the constellations (to be presently shown primeval, prophetic, and memorial), in combination with a monument built not only before the dissemination of the Hebrew Scriptures over the world, but before even the writing of them had begun.

Wherefore can there be any other explanation of so many mutually explanatory circumstances of opposite natures and independent origin, and now first brought together,—than that the Deluge to

¹ Hence, we may see an additional proof of the actual wisdom of the Pyramid's arrangements: for the Pleiades merely *opposite to a Draconis in right ascension*, would have been exceedingly indeterminate in date; but the above, combined with *a Draconis* at $3^{\circ} 42'$ from the pole (though that again *by itself* has uncertainties spreading over twelve hundred years), is precise in the extreme.

A star-map, specially adapted for tracing such changes as these, is now being prepared by Colonel Sir Henry James, R.E., Director of the Ordnance Survey at Southampton; it will form the fifth of his series of star-maps, and being on his peculiar projection of the sphere, which gives much more than half at one view, or as he both exactly and classically entitles it, '*Cæli, besse tenuis, liceat convexa tueri*,'—both the ecliptic pole, and the whole of the constellations, whether zodiacal or at any date equatorial, will be commanded on a flat surface. The maps, which are splendidly engraved on copper, are published, and may be obtained at the Ordnance Survey Office, Southampton; or by applying through any bookseller.

which they all refer must have been, at least as regards all mankind then living, a real and material phenomenon, and within the limits of time assigned by Scripture authorities? And if so, of course, it follows that the building of the ark of refuge is to be looked on as historical likewise. So that we then have from the Scriptures, first in this ark, and then in the subsequent ark of the testimony or of the covenant, two cases of real, practical work actually performed; and in each case according to linear measures and proportions previously announced by Divine inspiration,—while the middle date between these two cases, falls very nearly on the time of the building of the Great Pyramid.

We might indeed now, not unreasonably, put forward some further claims for the inspired origin of the Great Pyramid, depending on the manner of its memorializing a primeval and scriptural phenomenon,—but will content ourselves with merely remarking, that so far as the one point of chronology is concerned, there need be no objection to the inspiration hypothesis being tried further. And then there immediately arise some other and more directly related features, as well as some of a higher order, to be examined into.

Metrology suitable as a Subject?

Whether metrology at large, or some special means for the typification and regulation of weights and measures (which we now look on as the chief ori-

ginal purpose of the Great Pyramid), was a subject *likely* in the earlier ages of human society, to have formed the burden of any inspired commands from the dread God of all nature,—whom no man could expect to behold and live,—admits of quick general settlement; for, from the time of Pauton in France to John Taylor in England, very frequent reference has been made to passages in the earlier portions of Scripture, as in Leviticus, Deuteronomy, Proverbs, and Ezekiel, directly stating in the words of inspiration that such was the fact:—

LEVITICUS xix. 35-37.—‘Ye shall do no unrighteousness in judgment, in mete-yard, in weight, or in measure.

‘Just balances, just weights, a just ephah, and a just hin, shall ye have: I am the Lord your God, which brought you out of the land of Egypt.

‘Therefore shall ye observe all my statutes, and all my judgments, and do them: I am the Lord.’

DEUTERONOMY xxv. 15.—‘Thou shalt have a perfect and just weight, a perfect and just measure shalt thou have: that thy days may be lengthened in the land which the Lord thy God giveth thee.’

PROVERBS xi. 1.—‘A false balance is abomination to the Lord; but a just weight is his delight.’

PROVERBS xvi. 11.—‘A just weight and balance are the Lord’s; all the weights of the bag are his work.’

EZEKIEL xlv. 9, 10, 11.—‘Thus saith the Lord God, Let it suffice you, O princes of Israel: remove violence and spoil, and execute judgment and justice, take away your exactions from my people, saith the Lord God.

‘Ye shall have just balances, and a just ephah, and a just bath.

‘The ephah and the bath shall be of one measure, that the bath may contain the tenth part of an homer, and the ephah the tenth part of an homer; the measure thereof shall be after the homer.’

These words,—as we have attempted to set forth in Chapter iii. Part 5, of *Our Inheritance in the Great Pyramid*,—few though they be, yet compendious, imply that much besides was, and had been, actually done, performed, and completed practically,—before they could be, in any spirit of justice and mercy, issued as binding commands on a people just escaped from a grinding slavery.

But rather than go over that identical ground again, it may be more satisfactory to the reader, as well as more within the bounds of this division of our whole question, to quote the testimony, now one hundred years old,—and perhaps not so generally known as it deserves to be,—of the learned John David Michaelis of Göttingen.

An unusually good Hebrew scholar, his contributions to Biblical and Oriental learning are said by competent judges to be invaluable, especially when he treats of subjects capable of illustration from history and philosophy. In following up these views, and in order to throw more of the light of modern investigation on Biblical science, Michaelis planned the expedition to Arabia and India which was afterwards conducted by Carsten Niebuhr, and other travellers chiefly selected by Michaelis. His most celebrated work, however, is his *Mosäisches Recht*, in six volumes, in which his object is described by his English translator to be,—‘to investigate and ‘illustrate the philosophy of the Mosaic laws, to ‘show their wonderful adaptation in every respect

‘ to the very peculiar circumstances in which the
 ‘ people to whom they were given had been placed
 ‘ by Providence ; and, while he takes every opportu-
 ‘ nity of establishing the claims of Moses to the
 ‘ character of an ambassador from heaven, to incul-
 ‘ cate upon human legislatures the important lesson
 ‘ of studying those particulars respecting the nature
 ‘ and political situation, the ideas and prejudices,
 ‘ the manners and customs of their countrymen, by
 ‘ attention to which alone they can ever hope to make
 ‘ them virtuous, prosperous, and happy.’

Strong, then, in the principles of the subject, though unacquainted with some important features of absolute fact, as well as of characteristic differences, in the Egyptian and Hebrew metrologies,—such as we have attempted to set forth in vol. ii. pp. 454-470, ‘ On the Sacred Hebrew Standards of Weights and Measures,’—the worthy Michaelis expresses himself thus, in an extract which we are indebted to kind friends at Brighton for bringing to our attention :—

‘ OF THE PLANS WHICH MOSES TOOK FOR THE REGULATION OF
 ‘ WEIGHTS AND MEASURES.

‘ Here, then, we have a remarkable specimen of legislative
 ‘ policy ; and when I consider Moses merely as a man, without
 ‘ any reference to his Divine mission, he must, methinks, have
 ‘ profited by his education among the Egyptians ; but he has, at
 ‘ the same time, far surpassed them, and acted with much more
 ‘ honesty, than their policy,—which was so thoroughly interwoven
 ‘ with mystery and priestcraft,—permitted them to do. For

although he constituted the sacred tribe guardians of the sacred standards, and imposed upon them the duty of acquiring a knowledge of weights and measures with mathematical accuracy;—yet of things in which all were thus interested, he made no priestly mystery, but placed certain models of them all in the view of all; besides describing these in the books which were put into the hands of the whole people. Considering him, on the other hand, as sent by God, it appears to me, that he had in this matter, by God's express command, done the very same thing that a wise people had done of their own accord; but in a much more honest and open manner, and, at the same time, in a much higher degree of perfection.

In the first place, then, the weights and measures were preserved in the tabernacle of testimony, in more ways than one, and partly in the view of every individual, for at least many hundred years. Some of them, it is true, might by use and time suffer some change; but for that very reason, there were various standards, so that the error of any one could always be rectified by the others, and some of them were kept within the sanctuary itself, and were thus less liable to variation.

In the description of the tabernacle, we may, perhaps, have read, with some degree of weariness, many particulars relative to measures, in which we took no interest, and have often thought with ourselves in the meantime, "Why did not Moses rather leave this out? I should have dispensed with it." Some people, in order to assign some use to these mensurations, endeavour to discover in them a variety of types and mysteries. But, although I am very far from denying the typical nature of many of the Mosaic ceremonial laws, yet I cannot here agree with such people, nor comprehend what moral, doctrinal, or spiritual meaning there can be in *ten ells long, one and a half ell broad, and a half ell thick*. Others, again, equally shortsighted, are so vexed at finding that these things are of no use to them, as to conclude, with great theological depth, that they could not be written by the command of God, because they contain nothing useful or edifying; just as if God should have had the Bible written for them alone (a requisition, by the way, which they would never think of making in the case of any human work), or as if in a book written by the immediate command of God, there ought to be nothing that did not mini-

ster to moral edification; and as if revealed religion did not inform us that God had condescended to become a civil legislator to the people of Israel. This very specification of longitudinal measures, which we find so frequently repeated, answered one of the most important purposes of police to the Israelites, and as a masterpiece of legislative wisdom in this respect, it merits our admiration.

I shall now speak of their measures of length, measures of capacity, and weights, separately and in succession.

1. The longitudinal measure was fixed for future ages in a great variety of ways. The measures of the court of the tabernacle and its hangings (Exodus xxvii. 8-19); of the curtains that covered the tabernacle (Exodus xxvi. 1-13); of the boards that framed it, which were made of a wood very little apt to alter (Exodus xxvi. 15, 16); of the tabernacle itself, which was 30 ells long, and 10 broad; of the altar of burnt-offerings, overlaid with copper (Exodus xxvii. 1); are all specified in ells, and that in a book which every Israelite was to read. It is true, that the curtains and the wood might be affected by exposure to the atmosphere, although one error would correct another; but still every Israelite that came to attend Divine service, in any future age, would here obtain a pretty accurate view of the ell, and might, at any rate, measure some of those things with more perfect accuracy, and thus judge whether the nation still retained in common use the ancient original ell or not.

Still less variation was to be dreaded in those archetypes of the ell, that were kept in the sanctuary itself. Of the table of shew-bread (Exodus xxv. 23), the altar of incense (Exodus xxx. 2), and the ark of the covenant (Exodus xxv. 10), all the dimensions are specified. These were made of *acacia* wood, and only overlaid with gold. But the most invariable of all the standards of longitudinal measures, as being made entirely of gold, is the lid of the ark, which was two ells and a half long, and one ell and a half broad (Exodus xxv. 17). No doubt, this ark always remained in the obscurity of the sanctuary, unless it happened to be brought into the light by any rare occurrence, as during a campaign in the time of war. But for that very reason it was so much the more invariable, and could thus, if necessity required, serve, after many centuries, to ascertain

‘ whether any errors, and what, had affected the other standards
‘ of the ell.

‘ I admit, that at last a time *would* come, when all those
‘ standards of longitudinal measures would become useless,
‘ because nothing on earth endures for ever. But then new
‘ standards could be previously made from them; and we find
‘ that this was actually done. When the tabernacle (according
‘ to the reading in the printed Hebrew text) was 480 or (accord-
‘ ing to another reading which Josephus and Paul found in the
‘ Bibles in common use in Palestine in their time) 592 years old,
‘ and must certainly have been pretty much decayed, Solomon
‘ began the building of his temple. At this time they would,
‘ from the remains of the tabernacle, still be able to ascertain
‘ the Mosaic ell. This measure was transferred to the temple;
‘ and that edifice which, being built of stone, was liable to still
‘ fewer changes, particularly in a southern country, where no
‘ severe frosts make the stones of a building separate from each
‘ other, was 60 ells long and 20 broad; and thus, without taking
‘ into account other expedients that Solomon might have em-
‘ ployed for the purpose, the ancient Mosaic ell was preserved
‘ until the time of Nebuchadnezzar, by whom this temple was
‘ destroyed. The numerous golden utensils which it contained,
‘ the vessel called the brazen sea, and the two copper columns,
‘ *Boaz* and *Jachin*, of which the altitude and circumference are
‘ specified, answered the same purpose. Now the question is,
‘ Have we ourselves such ancient and such authentically attested
‘ memorials of *our* ell, as it was 480, 592, or, reckoning to the
‘ time of Nebuchadnezzar, 903, or 1015 years ago? (I know
‘ not whether we have or not; and I merely ask: for my readers
‘ will not be offended at me for my ignorance of many things),
‘ and are these (I really do not ask this question, for I well know
‘ the contrary) specified in a book, that is in every one’s
‘ hands?’

‘ From what I find merely in the details relative to the struc-
‘ ture of the tabernacle, where it is so manifestly his object to fix,
‘ in different ways, one uniform standard of measure, I am led to
‘ conjecture, that Moses had done still more with that view, and
‘ had given to the priests other special patterns of the ell, which
‘ they were ordinarily to use, and moreover, one archetype which
‘ they were sacredly to preserve. Of this, however, he does not

'himself inform us; but if it *was* the case, the models mentioned
 'in his writings, would always serve the purpose of preventing
 'any alteration from being made upon them, either from care-
 'lessness or fraud, without its being quite manifest to posterity.
 'This is actually more than what the author of the excellent
 ' *Essay upon Money and Coins* projected in the year 1758, and
 'Parliament took into consideration. And if the British Legis-
 'lature were desirous to insure to future ages the true measure
 'of the ell, on the Mosaic principles and plan, they ought to have
 'it ascertained by the mathematicians of St. Paul's Church, with
 'the most perfect accuracy, and to have an authentic record of
 'the mensuration drawn up in the plainest and briefest terms,
 'and published in a book, which every Briton might read, as
 'easily, at any rate, as the Israelite heard the law read, once
 'every seven years,—in the Catechism, for instance, or the
 'Calendar, which should not be allowed to be printed without
 'this appendix concerning St. Paul's.'

'It is to be hoped that my readers are, by this time, some-
 'what reconciled to the Mosaic measures; and that they will no
 'longer seek for types in the numbers; nor from the mensura-
 'tions, whence they can derive neither edification nor amendment,
 'deduce any more objections against the Divine mission of Moses,
 'and the inspiration of his writings; else must I class them with
 'the man who could not comprehend what could be the use of
 'the rampart of a fort, because he saw no crop of either rye or
 'wheat upon it, and therefore could not be persuaded, by all the
 'assurances that were given him, that it was formed after a plan
 'drawn by the king himself. "It is not," persisted he, "for
 '"use as a corn-field; neither wheat nor rye grows upon it;
 '"and our most gracious sovereign can have had no hand in
 '"any such thing."

'2. The measures for corn and wine (*mensuræ aridorum et
 'fluidorum*) were among the Hebrews more uniform in their
 'contents than ours are. For their *ephah* or bushel, and their
 'bath (for liquids) were equally large.'

'It is very certain that there was a standard of these measures
 'in the *sanctum sanctorum*, and that it stood before the Ark of
 'the Covenant. Moses was ordered to place an *homer* of manna
 '(and the *homer* is the tenth part of an *ephah* or Hebrew bushel)
 'before God; and it appears that the vessel was not of wood,

but of gold (Exodus xvi. 33, 36; Hebrews ix. 4). It is probable that there were various other measures in use, although Moses has not inserted in his writings any account of their contents. At this no one need be offended, who joined in finding fault with the too frequent repetition of the *ells*; for, in fact, measures of this description could not properly be specified in the Book of the Law, because the standard vessel, which was of gold, could not, without risk of being injured or stolen, be put in view of every Israelite, as the tabernacle was, in all its specified dimensions.

To notice, however, some *probable* examples of standard measures of capacity which may have been described in the catalogue by which the sacred utensils were delivered to the priests and Levites (Numbers i. iv.), I would remark that, belonging to the table of shew-bread, there were not only golden tankards in which wine stood, and from which it was to be poured out, but also small drinking vessels, shaped like cups, likewise of gold. Now, considering Moses not as sent from God, but as merely versed in the learning of the Egyptians, we must think it probable that all these vessels had their contents very accurately determined, I presume that the very same was the case with regard to the basins belonging to the altar of burnt-offerings; and for regulating the baking of the shew-bread, the flour for which the law fix't by bushels, there may have been a standard ephah within the sanctuary. Before the tabernacle stood the brazen laver. In the more particular description of the vessels delivered to the priests, it was probably specified how much water this laver contained, both when quite full and when filled only to a certain mark; and accordingly we find that the contents of this brazen sea, as it was called, are mentioned in both respects, in the historical books of 1st Kings (vii. 26), and 2d Chronicles (iv. 5).

3. As to weights, Moses specifies them in the following manner—20 *gerahs* make one *shekel* of the sanctuary; see Exodus xxx. 13, Leviticus xxvii. 25, Numbers iii. 47, xviii. 16.

3000 such shekels make one *kickar*, or talent. This appears from Exodus xxxviii. 25, 26; where 301,775 shekels are reckoned 100 talents, and 1775 shekels more. Moses gave no statute relative to the talent, as he did in the case of the *gerah* and shekel; probably because there was no dispute about the

talent, every one reckoning it at 3000 shekels; whereas the one shekel might comprise *more* and the other *fewer* gerahs.

By this information alone, however, posterity would not have been much benefited; for the question would be, *How much is a gerah?* and if it was replied, *The twentieth part of a shekel*, the question would recur, *And what is a shekel?* and if the answer was, *Twenty gerahs*, they would have been in the very same predicament in which the evil spirit stood, when he catechised the orthodox collier on the subject of his belief. If, in the course of time, the shekel became smaller, so likewise would the gerah diminish in the same proportion.

But here, too, a standard was provided. The fifty boards of which the walls of the tabernacle were composed, rested each upon two silver sockets, and every one of these hundred sockets was of the weight of a talent (Exodus xxxviii. 27). Here, therefore, they had no fewer than a hundred standards for the talent, by which the shekel could at any future period be determined. If they lost anything by friction it was in proportion very trifling; whereas in the case of smaller weights, like the shekel and gerah, the loss by wear or friction amounts to something more material. The golden candlestick in the sanctuary, together with all its appurtenances, in like manner, weighed a talent (Exodus xxv. 31-39); and in the catalogue according to which the different pieces of furniture belonging to the tabernacle were given in charge to their keepers, it was doubtless accurately specified what was the weight of the golden candlestick by itself, as well as of every golden pair of snuffers, and of whatever else belonged to it; and likewise that of all the golden articles belonging to the table of shew-bread, and of the golden lid of the ark with its cherubims. In this way they had a great variety of standards for their weights, and if in any of them, by the wear of the gold, any small diminution of weight took place, others were always at hand to rectify the defect. But it is not to be forgotten that these standards, of which some, at any rate, could certainly lose nothing by wear in the course of thousands of years, from their being so very sacredly preserved, were not of iron and copper, which in process of time are corroded by rust and verdigris, if exposed to dampness or even to acids, but of gold and silver, which defy moisture and the common acids. Nor was there any reason to

‘apprehend that the gold would ever be wilfully and feloniously
 ‘filed down, for the profit of such sacrilege would have been too
 ‘inconsiderable for people so rich as were the priests; and even
 ‘though we should represent them to ourselves as ever so destitute
 ‘of principle, they could scarcely have run the risk of being stoned
 ‘for a few grains of gold. Besides, they must have had to de-
 ‘liver the articles under their charge, according to their weight,
 ‘when required; not to mention that the sanctity of the golden
 ‘standards would make them shudder at the very thought of
 ‘committing theft upon them in any shape. The best possible
 ‘provision, therefore, was made for unalterable and authentic
 ‘standards of weight.’

‘And now, as to the superintendents of weights and measures.
 ‘These were, much in the Egyptian style, priests and Levites.
 ‘To them the standards were delivered; and, indeed, article by
 ‘article, to particular persons, that so, if of gold or of silver, they
 ‘might re-deliver it by weight; besides, the whole tribe of Levi
 ‘were maintained by the public in return for their devoting
 ‘themselves to the sciences. Nay, more, we find it expressly
 ‘mentioned in 1st Chronicles xxiii. 29, that David, when he
 ‘assigned to each Levite his department, appointed some to
 ‘superintend the weights and measures.’

‘Thus were these things really consecrated; and thus are
 ‘the words of Solomon in Proverbs xi. 16 true, in a sense which
 ‘readers seldom think of: *A just balance is sacred to Jehovah;*
 ‘*and all weights are his work.*

‘At the same time, however, Moses nowhere prohibits the
 ‘use of foreign weights and measures; at least I can recollect
 ‘no such prohibition; and from his so often mentioning the
 ‘*sacred shekel*, and in Leviticus xxvii. expressly saying, *All*
 ‘*estimations of vows shall be made by the sacred shekel*, it would
 ‘appear, that there had been another shekel, which he did not
 ‘prohibit, but only meant that everything in his laws relative to
 ‘imposts, penalties, etc. etc., should be understood in reference to
 ‘the shekel of the sanctuary. At any rate, there seem, besides
 ‘this sacred shekel, to have been many foreign ones, and, more-
 ‘over, a *royal shekel*, established by later laws (2 Samuel xiv.
 ‘26), and of a smaller weight than that of Moses; concerning
 ‘which I have treated in another place, and the origin of which
 ‘may have been the following. As it was not forbidden to deal

‘in common life by different weights, there arose, in process of
‘time, a much smaller, but variable shekel; and to prevent un-
‘certainty and imposition, the kings fixed the weight of this
‘common shekel more accurately; so that from this time there
‘were two lawful shekels current among the Israelites, the
‘*sacred* and the *royal*. Even Moses himself, in his historical
‘relations, does not seem to adhere uniformly to his own mea-
‘sures; as, for instance, where he describes the coffin of Og,
‘king of Bashan, as *nine ells long*, and *four broad*, measured by
‘the elbow of a man (Deuteronomy iii. 11); concerning which
‘passage, I request that the remark in my German version of
‘the Bible may be perused.

‘It is no doubt an imperfection of police to permit the use of
‘different weights and measures; and it may be asked, Why
‘Moses did not go a step further, and expressly prohibit all but
‘one set? We must here, however, take into consideration the
‘circumstances of the Israelites, and bear in mind, that, not
‘being themselves a commercial people, they were dependent for
‘trade upon other nations; upon the Phœnicians for maritime
‘commerce, and upon the Arabs for the caravan trade that
‘passed through Palestine. A people in such circumstances
‘cannot altogether avoid making use of foreign weights and
‘measures, if they would avoid being over-reached by the foreign
‘merchants, in whose hands the whole trade is; only they should
‘have one invariable standard of their own, to which all others
‘can be reduced, and *that* they ought in justice to use in dealing
‘one with another. This standard may, no doubt, be departed
‘from by an abuse, and other foreign weights, etc., become
‘current among the citizens; and I suppose it was some such
‘abuse that gave occasion to the establishment of the royal
‘shekel. Some writers, however, look upon the royal and sacred
‘shekel as the same; and if that be admitted, much of what I
‘have here written falls to the ground.

‘That Moses enjoins the use of just balances, and just weights
‘and measures, is very obvious. The statutes relative to this point
‘occur in Leviticus xix. 35-37, and Deuteronomy xxv. 14-16.
‘If it is forbidden there to have a great and a small bushel, a
‘great and a small weight, the meaning is not, that beside the
‘shekel of the sanctuary, they were not to have any other, nor
‘even in their dealings with foreigners to use *their* shekel; but

‘only, that they were not to have two different weights of the same denomination, a larger to purchase by, and a lesser to sell by.

‘It would appear, that these statutes were, in the time of Moses, pretty sacredly kept, because he does not once mention any punishment as being annexed to their violation ; but deems it sufficient to say, *Whosoever committeth such unrighteous deeds is an abomination to Jehovah thy God.* The very circumstance of their regarding balances, weights, and measures, as consecrated to the Deity, might keep a people, while yet honest and religious, from fraudulent practices, as being offences in the sight of a holy God. In later times, however, we find the prophets often charging them with the use of false weights, etc.’

So far the venerable Michaelis, on the proceedings of an inspired teacher among the Israelites and his method of illustrating, exhibiting, enforcing, and preserving extreme exactness with regard to one particular system of weights and measures ; a system too, which was considered so sacred, that any deviation therefrom was declared to be immediately and peculiarly obnoxious to Jehovah. All this description refers, indeed, to a period long subsequent to that of the building of the Great Pyramid ; but at another period much preceding that event,—or when the commands were delivered to Noah with regard to the formation of the ark,—a knowledge of what the cubits, so called, ‘of Jehovah’ are equal to, was evidently pre-supposed as then existing on the part of the patriarch. We have shown too, already, the commensurability (vol. ii. p. 470) of Solomon’s still later, ‘Molten Sea,’ with Moses’ Ark of the Covenant ; and everything that

we know concerning the *continuity* of the scheme of revelation from one end of the Bible to the other, allows us to admit of no other, than one, constant, length as the cubit of the sacred people of God in every age and in every clime.

Hence we cannot but see, that not only the subject of metrology, but more especially the formation of a sufficient monument to preserve the length of a certain set of sacred standards in a practicable and reliable shape,—from the time of the very Deluge or its proximate epoch, down to the ends of the world,—in a religious point of view,—is most agreeable to scriptural enunciations on the case. Nay, indeed, something of the kind would appear to have been, and to be, absolutely necessary; for how otherwise (see vol. ii. pp. 455 and 456), unless the original standards of *inspiration* are set before us, can we have full confidence in a supposed cubit of the present day being of the same length as the *sacred* cubit, and not more like any of the numerous other cubits of profane nations,—the employment of any one of which the Hebrews were especially taught, would have been abomination to Jehovah thy God. The scriptural family of the Hebrews, indeed, living in the earlier ages of the world, and only for a definite epoch,—could, for such period, be supplied and kept safe by a temporary set of standards;—but the Christian nations of the world three thousand years after the inspired Hebrew time, could only be served by something very different

from, and much more lasting than, Moses' standards of wood and gold.

Style of the Metrology suitable?

Although sufficing reasons may now be considered to have been produced, illustrating both the expediency and propriety of some grand and lasting monument of sacred origin having been erected, for the purpose of conveying to present and still future times the originals of the standards employed by Moses and Noah,—yet we are not thereby immediately justified in concluding that the Great Pyramid *is* that monument.

The Great Pyramid is indeed the worthiest building for the purpose yet known to man, being the largest, the most purely scientific in form, the most accurately and solidly constructed, the most capable of resisting alike fire and water, storm and earthquake; and actually does span all the immense interval, stretching from the latter days of Noah of the Hebrew Scriptures, down to—what many writers on the prophecies look on as the proximate termination of the Christian dispensation, and near approach of the second glorious advent. But we must pass all these things by for a time, while we put the building through another more searching test still,—by inquiring whether its peculiar and now well-ascertained metrology is *likely* to resemble very closely, that one sacred system of weights and

measures with which alone, Jehovah of the Hebrews desired to be served.

This point, however, we have in effect already settled, by the concluding memoir in vol. ii. ; where, founding on Sir Isaac Newton's admirable dissertation on cubits,—and agreeing with him that the sacred cubit was quite different from the profane Egyptian cubit,—we have yet found it (the sacred cubit), to be precisely the same as the cubit of the Great Pyramid. Found also that the most sacred Ark of the Covenant, was the same lidless-box measure, identical in cubic contents with the coffer of the Great Pyramid ; and found still further that Solomon's Molten Sea was of the same cubical capacity as the lower marked-off course in the King's chamber. Beyond this too still, we have shown at p. 240 in this volume, that the week of the Queen's chamber is identical with the sabbatical week, alike of the second chapter of Genesis and of the book of Exodus ; and is just as entirely different from the profane Egyptian week of old, as from the decadal week of the modern French metrical system ;—and all this being so,—why, the Great Pyramid is simply a representation of the sacred Hebrew weights and measures, so far as known,—and is in large opposition to either ancient pagan, or modern atheistical, measures. Hence our present titular argument is proved entirely.

There still remains, however, quite open, the further very important question,—whether the

people employed in the building of the Great Pyramid were those who, on scriptural grounds, may be considered *likely* to have been made the channels of inspired commands from God to man ; and for producing a then world's wonder, but ultimately a benefit in many ways to the whole human race. Wherefore we must next advance to the discussion of the

Suitability of the men concerned ?

Nearly all the recorded cases in Scripture, so far as we are aware, of inspiration having been granted for the purpose of promoting either directly or indirectly the revealed religion,—were confined to men conspicuous above their fellows for piety, morality, and amenability to the doctrines of that religion of which they were to become either the mouth-pieces or exemplars ; and the number of mortals so highly favoured, in post-diluvian times, seldom travelled far out of the direct line of the family of Shem.

But how does this principle suit the case of the Great Pyramid, if built, under instructions from the same inspiration, but in Egypt, and by the hands of Egyptian workmen,—Egypt being the most wofully idolatrous of all countries ; while its people were exclusively descendants of Ham ?

Several answers in mitigation somewhat of this extreme view of the Egyptian idolatry,—everything else being allowed as above stated,—have been attempted by various hands.

In the first place, for instance, there has been a growing feeling of late,—among those men who have made a special pursuit of Egyptian hieroglyphics, sculptures, and paintings, and who consider deep and curious investigations into the detail of the animal-headed Pantheon of ancient Egypt, a most worthy and elevating study for Christian men of the present day,—that it was not all so bad as it looks. They have strong impressions, say these well-meaning students, that the old Egyptians were not so very far from the truth; and that all these idolatrous figures on the temple-walls which offend the eyes of casual observers,—were deep-meaning mysteries and symbolical expressions of something really very different in its nature. And in fact, these modern students not only endeavour to show that Moses formed the chief part of the Hebrew worship on the model of the Egyptian; but that the latter faith, on receiving ‘its expansion into the world,’ became the effective origin of the Christian religion as well. ‘At the present day,’ says one of these authors, ‘Christianity, Judaism, and Mohammedanism keep ‘the conscience of the world, and as each of these ‘religions was merely *the Egyptian idea* carried ‘(*colportée*) into another country, it is in reality ‘*the Egyptian idea* which still rules the world.’ ‘In stating this fact,’ proceeds the author in question, ‘we conceive we have been acting in a very ‘Christian manner; for it belongs to a Christian to ‘know how to render to Cæsar that which belongs

‘to Cæsar, and to God what belongs to God; and
‘similarly to the Egyptians what belongs to the
‘Egyptians, instead of robbing them.’¹

Now very far be it from us, to refuse to the Egyptians whatever really belongs to them; and with regard to all their sculptures of animal-headed gods, and actual worship of animals, we know of no reason whatever why Egyptians should not have the full credit, and responsibility too, of having invented them. On the very same principles, indeed, whereby we could *not* allow Egyptians to have conceived the idea of the Great Pyramid as a metrological monument,—because its birth was *not* after the necessary manner of all human beginnings (p. 371),—we are specially bound to let them, the Egyptians, take to their share all their false gods;—for the number of these *did* increase with their own growth and strengthen with their strength as a nation, according to the law of human inventions and national commencements. So that although in the earlier monuments such idolatrous figures are few and far between, they abound exceedingly in the later days of the eighteenth and nineteenth dynasties; and have even forced from M. Renan the remark we have already given, as to the temples of that period seeming, when contrasted with the earlier, to have been ‘invaded by a whole Pantheon, the

¹ *Les Divinités Égyptiennes, leur origine, leur culte, et son expansion dans le monde.* Par Olivier Beauregard. Paris, 1866. See p. 604.

‘most horrible and ridiculous that the human mind
‘has ever conceived.’

‘Ah!’ but say others of the Egyptologists, ‘though
‘the figures *appear* repulsive or silly, that is only
‘because they are mysteries to the uninitiated.’

When these gentlemen have tried to prove their case openly, in some other manner than by mysterious assertion,—it will be quite time enough to examine their reasons; but in the meanwhile it is sufficient for all the plain-speaking world, that neither the Mosaic nor Christian religions either copied or permitted such a pictorial or sculptorial method as that of the Egyptian temples, for concealing grand ideas of religion from the people. The adoption, indeed, of such devices as figures of animal-headed gods in every city of the land, by the Egyptians, even for a good purpose momentarily allowed, placed them in antithesis to the religion of inspiration. But we have only to read the accounts of what the religion of the Egyptians actually was, by those who saw them engaged at it—to perceive that their purpose was not good, and that they did worship animals as gods; for thus, as merely one among hosts of similar witnesses, did Clemens Alexandrinus write 1600 years ago:—

‘Among the Egyptians, the temples are surrounded with groves and consecrated pastures;
‘they are furnished with propylæa, and their courts
‘are encircled with an infinite number of columns;
‘their walls glitter with foreign marbles, and paint-

'ings of the highest art; the *naos* is resplendent
 ' with gold, and silver, and electrum, and variegated
 ' stones from India and Ethiopia; the adytum is
 ' veiled with a curtain wrought with gold. But if
 ' you pass beyond into the remotest part of the en-
 ' closure, hastening to behold something yet more
 ' excellent, and seek for the image which dwells in
 ' the temple, a *pastophorus* (or shrine-bearer), or
 ' some one else of those who minister in sacred
 ' things, with a pompous air, singing a pæan in the
 ' Egyptian tongue, draws aside a small portion of
 ' the curtain, as if about to show us the god; and
 ' makes us burst into a loud laugh. For no god is
 ' found within, but a cat, or a crocodile, or a serpent
 ' sprung from the soil, or some such brute animal;
 ' the Egyptian deity appears,—a beast rolling him-
 ' self in a crimson coverlet.'

Even if we enter still more into the inner life of
 their religion, and take for our guide, not an ancient
 Greek living in the time of the Egyptians, but a
 modern European 'Egyptologist,' translating re-
 cently exhumed papyrus rolls,—the religious phrases
 and ideas are again found as opposite as they can
 well be to the religion of the Bible. This one fol-
 lowing illustration will probably suffice. We choose
 it because it is found more elaborated in the later,
 than the earlier, papyri; indicating it, in so far, to
 be the growth of the Egyptian mind; and it con-
 sists in these two points mainly, 'first, the rejection
 ' of any idea of an atonement; and second, the self-

'assertion' by every man, of his own absolute and 'complete righteousness.' (See p. 430.)

Hence, our examination of the first apology for the Egyptians, ends in showing them more than ever, as *not* the people likely to have received any inspiration for Bible purposes.

But then arises a second class of apologists,—who allow freely that in the latter days of the Egyptian monarchy, their religion did become very gross,—but state their belief that in the Pyramid-building age, there was no idolatry in Egypt; and that even down to the visit of Abraham, or the close of the old empire, 'the one God was still invoked at 'the altars of the Nile land.'¹ Others further assert, there was no animal-worship in Egypt until after the Exodus.²

'There are even passages in the inspired volume,' continues one of the apologists, 'which seem to hint 'at a special revelation to the sons of Ham, anterior 'to the call of Abraham. Horeb would appear to 'have been known *as the mountain of God*, before 'it was made the scene of a Divine manifestation to 'Moses. The Syrian nation in an earlier and purer 'stage of its history seems to have been favoured 'with *a peculiar presence of God*; and the Syrians 'being Cushites, were nearly allied to the children 'of Mizraim, or the Egyptians. The families there- 'fore of Cush and Mizraim, Palestine, Egypt and

¹ Rev. George Trevor's *Ancient Egypt*.

² Rev. H. Browne's *Ordo Sacerdotum*.

'Ethiopia (*i.e.* Arabia), might keep their religious festivals at Horeb, as the children of Israel afterwards went up to appear before the Lord in Jerusalem. The *Mount of God* would thus be the centre of worship to a band of kindred nations, scattered between Libya and the Persian Gulf, till a gradual apostasy vitiated their covenant, and another law, another priesthood, and another people were chosen out of the families of Shem.'¹

With the latter part of the argument we shall not attempt to deal, having no contemporary monuments wherewith to compare it, and considering it therefore altogether above our powers. But with the former part, or that asserting Egyptian idolatry to be a growth entirely subsequent to the time of Abraham, or later,—we enter into direct antagonism; for the Sinaitic tablets of the kings of the fourth dynasty, or two hundred years at least before Abraham,—show animal-headed gods as rampant: besides which, Manetho expressly states, that earlier still, or in the time of the second dynasty, 'the bull Apis in Memphis, and Mnevis in Heliopolis, and the Mendesian goat, were appointed to be gods in Egypt.'

In addition to which we may announce, from finding a large greenstone statue of a baboon god, half-buried in the sand at the north-east corner of King Shafre's tomb,—and from picking up a fragment in

¹ *Ancient Egypt*, by the Rev. George Trevor, M.A., Canon of York, pp. 113-115.

diorite, apparently the shin of a figure of Pthah, —near the temple in front of the second Pyramid,—that the Egyptians had then loose and portable idolatrous images, like Laban's gods, though the standing walls of their temples were not as yet carved and sculptured.

True it is, no doubt, that the Pyramids generally are without either idolatrous decorations or contents; but that is at once shown by the above to depend, not on idolatry being as then uninvented, but more probably because each Pyramid was a blind copy from another Pyramid; and the origin of them all was the Great Pyramid, in which the reasons, whatever they were, for omitting idolatrous allusions, concentrate themselves.

To that vast and admirably preserved monument, all men can still go, and undoubtedly see that there is no idolatry within it at all. While the traditions of 2300 years old,—relating how that freedom was procured; viz., by Kings Shofu and Nu-Shofu of the hieroglyphics, or Cheops and Chephren of Herodotus, shutting up the temples and forcibly stopping the animal-worship of the people for the time,¹—these traditions, we say, in so far as they can be trusted, only make it more certain than ever that the people of Egypt, were no more at that period than at any other of their history, like those whom Jehovah was accustomed to favour; from Noah who was a preacher of righteousness, or Job

¹ Compare Herodotus, Diodorus Siculus, Manetho, and others.

who was the servant of God, down to Moses and the prophets of Israel.

It might have been expedient, in the 'Divine economy,' to employ the *people* of Egypt in the building operation, on account of their remarkable talent for mechanical work of an enduring order. The descendants of *Shem*, certainly had no leading capacity that way ; so that centuries after the great Pyramid had actually been built, Abraham, Isaac, and Jacob lived in nothing more substantial than tents ; each of them being emphatically described as 'a Syrian ready to perish ;'¹ a mere wanderer on the face of the earth, without settled or solid habitation.

The sons of Cush are indeed honourably noted in Scripture,—and more prominently than their cousins, the Mizraites, and all others,—as adepts in building ; so that even before the dispersion, Nimrod's kingdom is at once defined by his four great cities :—

'And the beginning of his kingdom was Babel, and Erech, and Accad, and Calneh, in the land of Shinar.

'Out of that land went forth Asshur, and builded Nineveh, and the city Rehoboth, and Calah, and Resen between Nineveh and Calah : the same is a great city.'

But not only were these cities,—in so far as we may judge from the remains of some, and of the successors of others, in the same Cushite or Chaldæan land,—

¹ Deuteronomy xxvi. 5.

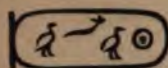
built of very perishable materials; but there were none of them either in, or even near, a country of appropriate *latitude* for the Great Pyramid. That remarkable monument demanded to stand in the parallel of 30° ; and Egypt was the only country of the then world containing both that latitude, and a people clever in building after a permanent manner.

But then, it was by no means necessary for the mere performance of the masonry part of the operation, whereat they were already skilful, that the Egyptian workmen, when employed on the Pyramid, should have received inspiration from on High. Enough, if those who kept them to the Great Pyramid, rather than any other work, and more especially those who told them what lengths, breadths, heights, and angles to make the several parts of the Great Pyramid,—were so assisted.

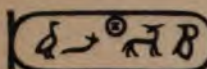
Now all traditional and monumental testimony assure us, that the Kings Shofu and Nu-Shofu were at least those who kept the Egyptians to the work of the Great Pyramid. Were they then also those who were gifted with the superhuman knowledge for the time, of being enabled to lay down the proportions requisite to cause the Great Pyramid to become the wonderful metrological monument which modern science, after four thousand years, is proving it to be?

There seems at first to be something in favour of the idea; because, even by the confession of their

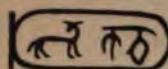
Of the
Fourth and neighbouring
DYNASTIES.



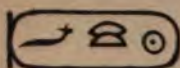
Shofa.



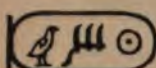
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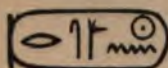
Nu.



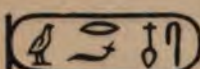
Shafre.



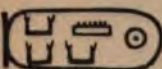
Soris.



Userchre.

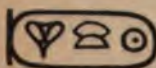


Sephuris.



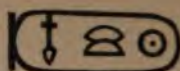
Mencheres.

Of the
XIVth DYNASTY,

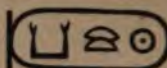


*Later Xoile/
monarch.*

XIV DYNASTY cont.^a



Xoile cont.^d



D^o D^o

Of the
XIXth DYNASTY,



*Thothmosis 4
or
Armais.*



*Ramses 2,
or
Sesostris Ramses.*



D^o D^o



Thuoris.



*Sethos 2
or
Amenemnis.*

the fact that the Government has been unable to obtain a satisfactory response from the United States. The Government has been unable to obtain a satisfactory response from the United States. The Government has been unable to obtain a satisfactory response from the United States.

1. THE STATE OF TEXAS, County of EL PASO, do hereby certify that
 the within and foregoing is a true and correct copy of the original
 of the same as the same appears from the records of the County Clerk
 of said County, at this day of NOVEMBER, 1919.
 County Clerk.

...ing before the end of the ...
...the goats, ...
...years, becoming ...
...whether we are ...

• The causes of the king's death at the time of the building, were generally only, and due to the excessive pressure for a time brought on that country, they were not too original, immediate, and important symptoms of the disease to prevent which, nothing short of a complete reorganization of the Government and its administration would be required.

the required measurements, and the results were then shown to the students. The instructor then explained that a "good" student is one who can find the right question to ask, and that a "bad" student is one who cannot.

[illegible]

enemies, those kings did stop animal-worship for a time; and sundry tomb-inscriptions, translated by W. Osburn, show them to have been, in all other things, beneficent monarchs, attending to the solid interests of their people,—and not by any means such barbarous rulers and profligate tyrants as the priests of the idolatrous temples in after times used to love to represent them. But then again, these same traditions going on to describe Shofu and Nu-Shofu (Plate XIII.) as having before the end of their lives become *repentant* towards the gods,—i.e., the animal-gods; or, in other words, become favourers of animal-worship once again,—we are induced, therefore, to fear, that the good courses of the kings during the time of the Pyramid building, were temporary only, and due to some peculiar pressure for the time being; or that, in fact, they were not the original, immediate, and worthy recipients of that inspiration, under which, and under nothing short of which, the arrangements, proportions, and measures of the Great Pyramid could have been received.

(The inspired messengers, were foreigners?)

Whereto then shall we look for any known historical medium, that would be recognisable on Scripture experiences of inspiration, wherever certainly enjoyed?

John Taylor found, that on the Hebrew chronology, Noah must have been still living when the Great Pyramid was built; and felt inclined there-

fore to expect that so venerable a character, already experienced on the ark in building according to measures divinely communicated, may have had some share in the operation. And who shall say that he had not? We hardly know, unless it be those ordained priests in the Established Church, who declare that the chronology of the authorized English Bible, as being translated from the Hebrew, is entirely false for all the earlier periods; and that according to the Septuagint, which alone is true in time particulars, Noah must have been dead for several centuries before the Great Pyramid began to be built. But it is hardly worth our while to enter into discussion on this question at present, because, let the death of Noah have occurred at almost any time, there is no direct mention in the Bible of his having been engaged in building a Pyramid in the land of Egypt.

Much the same, too, may be said for the claims of 'Peleg and the sons of Joktan.' For though John Taylor¹ has shown with much learning, that the former name signifies '*division*,' with probable reference to geographical science; and that 'Almodad,' the eldest of the latter, signifies '*the measurer*;' while in an old Chaldæan paraphrase, the same personage is even declared to have been 'the inventor of geometry, and one who measured the earth with cords;' and though much Divine favour appears to have been shown to the family (each of the thirteen

¹ *Great Pyramid*, chapters xxiv., xxv., and xxvi.

sons of which has his name expressly given in the Bible,—the last of them, Jobab, being thought to be Job, in whose majestic book, as will presently be shown, there do appear some allegorical allusions to the Great Pyramid; still none of these things are sufficiently to the point, or capable, by ourselves at least, of being considered as contemporary Scripture authority, for any one of the personages named having been sent down to the land of Egypt: nor for their being instructed from on High to build a Pyramid in that land; and gifted with eloquence to persuade, or power to control, the men of the region to act according to his orders.

Yet though we can find no direct authority from Scripture for any one being thus sent to Egypt during the Pyramid-building age,—there is a very noteworthy allusion in the sacred pages respecting some persons, families, or people being brought back *from* Egypt, and planted in Palestine about that time, and under the Divine favour. There is the well-known tradition, moreover, on the other hand, collected in Egypt by Herodotus—of a remarkable shepherd, or Palestinian, having been encamped near the Great Pyramid during the time of its building; and having had, in the estimation of the people, much to do with the progress of the work.

The first of these notices is to be found in Deuteronomy, second chapter; where Moses,—when encouraging the Israelites to be of good heart in their march under Divine favour out of Egypt and into

Palestine,—mentions two other and *preceding* cases where God had been pleased to conduct other nations into a new country, and had given them the lands of the previous inhabitants, as thus :—

‘As he did to the children of Esau which dwelt in Seir, when he destroyed the Horims from before them; and they succeeded them, and dwelt in their stead, even unto this day :

‘And the Avims which dwelt in Hazerim, even unto Azzah, *the Caphtorims, which came forth out of Caphtor*, destroyed them, and dwelt in their stead.’

Now these Caphtorims are usually (for there have been other theories broached) supposed to be Egyptians; or persons at least out of Caphtor, which is considered to be the north-western part of Middle Egypt, or the very locality of the Great Pyramid. And, that they were positively brought out of that region under Divine favour, and in a manner typical of the subsequent bringing out of the Israelites,—is still further to be inferred from the following :—

‘Have not I (the Lord) brought up Israel out of Egypt? and the Philistines from Caphtor, and the Syrians from Kir?’ (Amos ix. 7.)

The second again, of the above notices alluded to, is the very unintended and incidental tradition in Herodotus, to the effect,—that the Egyptians so exceedingly detested the kings under whom the Great Pyramid was built, that rather than mention their names when asked who erected the colossal monu-

ment, they would say,—either that it was built when the shepherd Philition fed his flocks thereabout;¹ or that the Great Pyramid was called after him, and that he was ‘the great enemy of the ‘Egyptian gods.’²

Now any servant of the Almighty must have been necessarily obnoxious to the gods of Egypt and their worshippers; and while no man of humble calling amongst the Egyptians would ever have been allowed any separate existence or identity under their oppressive government,—we may be assured, from all their traditions and history, that the name ‘Shepherd,’ implied a Palestinian, or one from Palestine, and arriving in Egypt through the Isthmus of Suez. The particular name of ‘Philition,’ implying, moreover, as John Taylor was disposed further to imagine, a remembrance of the feasts whereat there is a shedding of blood for the propitiation of sins; or a characteristic of the first shepherd Abel, and the religion subsequently taught to mankind through the descendants of Shem: but hated even to ‘abomination’ by the Egyptians.

The shepherd Philition, then, with his friends and flocks at the Great Pyramid, looks exceedingly like a Scripture character; and if he would preserve his descendants in the true religion, and free from bondage to the Pharaohs of Egypt,—it was abso-

¹ See Rawlinson's *Herodotus*, volume ii. p. 207, with Sir Gardner Wilkinson's note.

² *Ancient Egypt*, by the Rev. George Trevor, p. 118.

lutely necessary that he should leave that land again, as soon as possible after he had performed the business for which he originally journeyed there. Hence, if he went to it charged with the message of the Almighty, we need not be surprised that the Almighty's assistance was given in bringing him out of the tyrant's clutches again; even in such manner as the Lord expressly states that He *did* bring the Philistines and Caphtorim out of Caphtor or Egypt.

(Cuseans retire from Egypt, northwards?)

This pre-Mosaic bringing-out, then, for which in itself there is direct Scripture authority, we are inclined, on account of the mutually explanatory facts, to connect with the shepherd Philition, and his friends of Great Pyramid Pagan fame; and there appears to have been, after a most noteworthy manner, from that time subsequently,—a continued series of successions between those Philitian shepherds from Egypt and the Israelites,—in several important parts of the world. The principal steps too in this remarkable chain of coincidences, were,—independently of all Pyramid allusions, and with sometimes needless digressions to the subsequent shepherds of the fifteenth Egyptian dynasty,—discovered by the learned Jacob Bryant, and published by him in his Dissertation on Ancient History in the year 1767.

Sons of Chus, Cuseans, and Cushites, he appears

to consider them,—shepherds too, of Egyptian story, though not of the Egyptian nation or faith either,—in their first retreat from Egypt, they retired towards the Amalekites, and the country to the south of what was afterwards Judah's portion of the Holy Land; 'for there are many names of places that correspond exactly with others in Egypt, which we have shown,' says Bryant, 'to have been of Arabian original. There is in the first place to be found the name of the very country they had deserted, Goshen or Gushin,' as testified twice over in the Book of Joshua, with the further indication in Chronicles, 'that they of Ham, or out of the land of Egypt, had dwelt there of old.'

But these Philitians from Egypt did not remain in these parts so long as to be involved in the subsequent destruction of the Canaanite nations by Joshua;—for they seem, on the contrary, to have at an early period betaken themselves further northward, or into the upper parts of Mesopotamia. Because, 'here too,' says Bryant, 'was a land of Goshen, and a river Gozan, the same as the Chabor. Also the river Seghor, or Sehor, which was the name of the Nile in Egypt. All these circumstances prove that the sons of Chus forced themselves very early (after their sojourn on the Nile), into the upper provinces of Mesopotamia.'

'In this country also, were the tribes of Israel (afterwards) placed; at least a great part of those who were carried away captive by Shalmanasser;

‘ who took Samaria, and carried Israel away into
 ‘ Assyria, and placed them in Halah and Habor
 ‘ by the river Gozan, and in the cities of the Medes
 ‘ (2 Kings xvii. 6). Halah and Habor, called like-
 ‘ wise Chala and Chabor, were, as I have in part
 ‘ shown, in the upper region of Mesopotamia between
 ‘ the Tigris and Euphrates ; both upon the Gozan,
 ‘ called likewise the Chabor ; the cities of the Medes
 ‘ were beyond. There was something very signal
 ‘ in the catastrophe of those tribes, that were carried
 ‘ into the country, which I have been describing.
 ‘ It is well known how the Israelites, after their
 ‘ servitude in Egypt, were conducted to the land of
 ‘ promise, which they enjoyed above seven hundred
 ‘ years. Upon their repeated rebellion and idolatry,
 ‘ ten of the tribes were carried into a second bondage ;
 ‘ and, what is remarkable, many of them went into
 ‘ another land of Goshen ; but not like that of old,
 ‘ to another Avaris ; and in succession to the same
 ‘ people, to whom their fathers had succeeded in
 ‘ Egypt, even Cuseans.’

(Egyptians punished in the Great Pyramid ?)

In this reiterated manner do the destinies and successive local habitations of the Israelites and the Philitian shepherds of the Great Pyramid, appear to be interwoven ; and it is possible we have not come to the last of their accompaniments and mutual illustrations even yet. But these things belong to another chapter ; and meanwhile, if we have been

enabled with regard to the very distant past alone, to indicate something of the course actually taken by Divine inspiration, for propounding amongst men and carrying out the laborious plans of the Great Pyramid,—our readers may probably be struck with, on one side, the scriptural appropriateness of the manner in which the idolatrous and Cain-like Egyptians were made, without being at all aware of it, to carry out other ideas than their own.

This undoubtedly remarkable people, had in its first origin as a nation, fled from before a judgment in the land of Shinar ; but arrived on the banks of the Nile, unsubdued, unrepentant, and still determined ‘not to be scattered abroad.’ They repeated, therefore, their coercive political system ; and for a time they throve and waxed exceeding mighty, above all the then nations of the earth ; they wrote, they built, they ploughed, they sculptured, they painted, they warred, and they tyrannized ; but at the moment they held everything vile before them, and asserted that they were indebted for their greatness to themselves alone, and their own purity,—then were they made to erect the most toilsome monument which the whole world has ever seen ; not for their own glory as they thought, but really, and in the latter end, for the honour of the God whom they had despised, and even dethroned, in favour of bulls and goats.

‘Egypt, in fact,’ says Chevalier Bunsen, and here with the utmost truth, ‘Egypt appears as the instru-

'ment of Providence for furthering its eternal purpose, but only *as forming the background and contrast* to that free, spiritual, and moral element 'which was to arise out of Israel.'¹

Even as perfect part of such a scheme, does the manner of erection of the Great Pyramid now appear ; for it tells in more than speaking terms of the marvellous talents in constructive art, and for administration, which the Lord had bestowed on Egyptians through their progenitors, and intended them to use them well. But they forgot wherefore these gifts were received, and in place of devoting them to the service of the God of all nature, they employed them to strengthen themselves against Him.

The spirit, then, of the Egyptians at the building of the Great Pyramid, was the same which marked them, both at the oppression of the children of Israel afterwards ; and, in conjunction with other peoples, at the building of the tower of Babel before. In so far as the Egyptians could accomplish it in their new work on the banks of the Nile, and as they flattered themselves, too, for ages that they had accomplished it even to the full,—the Great Pyramid was a resurgence in a new land, and with a community speaking a new language, of their thwarted ideas in another place ;² but through the humble

¹ Bunsen's *Egypt's Place in Universal History*, vol. iv. p. 104.

² 'And they said, Go to, let us build us a city, and a tower whose top unto heaven ; and let us make us a name, lest we be scattered abroad upon the face of the whole earth.'—Genesis xi. 4.

agency of the shepherd Philiton, their labours were made really to tell against themselves; and have eventually caused the Great Pyramid to become in these latter days a most distinguished protest against the ancient tower, and all the principles of false religion connected therewith or descended therefrom.

On the other hand, if the inspiration afforded on this remarkable occasion, was vouchsafed not to a descendant of Shem, but to a Cusean, *i.e.*, if Philiton was a son of Cush,¹ some other momentous openings thence arise.

(Early Shemites not chosen?)

From Abraham downwards, for instance, as every one knows, the race of Shem in his line was peculiarly favoured; in so far fulfilling not only the promises of the Almighty made to Abraham, but those also through Noah to Shem himself. But from Shem to Abraham is a long and dreary genealogical journey; during the latter part of which, at the least, even the lineal ancestors of Abraham had become so engrained in idolatry, and so given to the worship of other gods than the true God,—that Abraham had to be called out from amongst them, in order to live a pure life and receive the blessing.

Hence, while there is reasonable doubt, whether in the year 2170 B.C. a descendant of Shem was then

¹ In subsequent times the name of Cush was applied to Ethiopia; but we here employ it in accordance with Genesis chap. x. verses 8-12.

worthy, on the score of faith and religion, to be charged with any message of the Almighty,—there is on another point almost a certainty, that no Shemite was so fit for the peculiar Pyramid work, as a Cushite. For the Shemites were originally dwellers in tents, and had at that early period no more notion of masonic art or practical science, than any Bedouin Arabs of the present day,—who are still living under both the tent-poles and tent-cloths of Kedar; and, if cultivating and developing any scientific faculties at all, it is rather those connected with logic, metaphysics, moral philosophy, and other mental affections,—than any of those branches of *natural* philosophy which might enable men to execute mathematical forms on a large scale, in a solid material, with exceeding accuracy, and with a power for enduring through all human time.

True it is, no doubt, that the Almighty has it in His power to inspire any man, and for any work whatever, though never so strange to his previous constitution and knowledge. But, judging from Scripture, *that* is not the manner in which it has generally pleased the Lord to exert His inspiration gift; for in the instances recorded there, that man was almost invariably taken for either anointing or gifts who was nearer than his fellows to the quality required; and who could perhaps on that very account, be afterwards permitted so much free agency even under inspiration, that the prophetic messages are generally found tinged more or less

with the previous life-experiences of each particular prophet.

The defect, then, of the Shemites, in not having early improved their faculties for practical science, may have lost them an opportunity indeed, in the history of the world ; and in that case, gave it to the Cuseans. Of these we have not hitherto been hearing much ; but if it be true that their chief work remains behind them, and speaks in a language of which modern science is the simple and yet powerful key, more will be known concerning them as the centuries roll past.

(A new objection.)

But now, that so much connected with Divine inspiration has been approximately made out,—an objection to the whole subject of this chapter may probably arise in some minds ; and, if Cuseans were really employed, such objection will be greatly strengthened, and probably stated thus :—

‘ In the early ages of the world there were, and even must have been, many inspirations from God to man ; but being connected merely with giving to him in his infancy the beginnings of useful arts, they were not deemed appropriate to be mentioned in the Bible, which records alone things necessary to salvation. Now,’ continue these objectors, ‘ even if the architect of the Great Pyramid *was* inspired, still the subject of the Great Pyramid being connected with precisely such useful arts, its inspira-

‘tion cannot be looked on as a *religious* inspiration, ‘has no place in the Bible, and need claim no regard ‘from any Christian in the present day.’

In reply to this, let us see what the Bible, which says so little about the builders of the Great Pyramid, may say about the Great Pyramid itself; for from the Bible alone can a safe opinion be formed.

Pyramid itself, whether Scripturally acknowledged!

This branch of the religious bearings of the subject we owe almost entirely to John Taylor. He it was who first perceived an allusion to the Great Pyramid in the Book of Job—a work arranged in its present shape by Moses,—but descriptive of the life-events of one who had flourished seven hundred years earlier, or at the very time nearly of the building of Great Pyramid.

In the chronology of the margin of some Bibles, the date B.C. 1520 is inserted against the Book of Job, but more to represent the time of Moses writing, than the age of Job’s living: while Townsend, in his Chronological Index to the Holy Scriptures, gives the date of Job himself as B.C. 2130, *i.e.*, within forty years of the Great Pyramid’s foundation; and appends the following note:—

‘The life of Job is placed before the life of Abraham, on the authority of Dr. Hales. Job himself, ‘or one of his contemporaries, is generally supposed ‘to have been the author of this book, which Moses ‘obtained when in Midian, and, with some altera-

' tions, addressed to the Israelites. But my chief
' reason for assigning to the life of Job its present
' date, is derived from a consideration of the manner
' in which God has condescended to deal with
' mankind.

' Idolatry, as we read in the preceding part of
' this period, had occasioned the dispersion from
' Babel. It was gradually encroaching still further
' on every family which had not yet lost the know-
' ledge of the true God. Whoever has studied the
' conduct of Providence, will have observed that
' God has never left himself without witnesses in
' the world to the truth of his religion. To the
' latter times of patriarchism, Abraham and his
' descendants; to the ages of the Levitical law,
' Moses, David, and the Prophets; and to the first
' ages of Christianity, the Apostles and the Martyrs,
' were severally witnesses of the truth of God. But
' we have no account whatever, unless Job be the
' man, that any faithful confession of the one true
' God arose between the dispersion from Babel and
' the call of Abraham. If it be said, that the family
' of Shem was the visible Church of that age, it
' may be answered, that it is doubtful whether even
' this family were not idolatrous, for Joshua tells
' the Israelites (Joshua xxiv. 2) that the ancestors
' of Abraham were worshippers of images.'

The times of Job then were evidently remarkable
ones in the history of God's government of the earth,
even as Job himself was especially 'the servant of

‘ God ;’ and we may also imagine those times (without any guiding reference derived from their date, as above, and that of the Great Pyramid), to have been contained within the period of *smaller* Pyramid building for sepulchral purposes,—from the improved translation in Job iii. 13 and 14, as given now for several years past by Mr. Gliddon and other leading Egyptologists ; wherein we read after Job’s expressed wish to have died, his further exclamation :—

‘ For now should I have lain still and been quiet,
‘ I should have slept : then had I been at rest

‘ With kings and counsellors of the earth, which
‘ built Pyramids (desolate places) for themselves.’

The manner of mention here contrasts rather noticeably with another, recently pointed out by Dr. Horatius Bonar, in Jeremiah’s Lamentations iii. 6. This Prophet wrote his inspired Lamentations in Egypt, so that it is perfectly possible that he may have seen the Pyramids, and included the Great one amongst those ‘ signs and wonders set in the land ‘ of Egypt, by *the Lord of Hosts*, great in counsel ‘ and mighty in work :’ and which signs and wonders being made to *last* there, even up to his, Jeremiah’s, day,¹ may be inferred to have been of a material order. But that day was long subsequent to the time of Job ; probably in 588 B.C., when Pyramid building had long ceased throughout all Egypt ; and such specimens as still existed, were separated at their foundation by more than twenty dynasties

¹ Jeremiah xxxii. 18-20.

of kings from that late period of the new empire in Egypt. Wherefore the mention of them by the Prophet of the Lamentations appears peculiarly appropriate in the words,—

‘He hath set me in dark places (or Pyramids), as
‘they that be dead of *old*.’

While some of Job’s descendants are moreover often looked for among the Sabeans of Arabia, Mr. Palgrave mentions, in his volumes of recent and very instructive travel there, that old Arab writers relate of the Sabeans, ‘that they had a special
‘veneration for the two great Pyramids of Egypt,
‘believed by them to be sepulchres of Seth and
‘Idrees; that their stated prayers recurred seven
‘times a day (although some others say five,—a
‘divergence which may admit of easy explanation),
‘and that during their devotions they turned their
‘faces to the north,’—the direction of the entrance passages of those Pyramids, and 90° distant from the ancient western opening of tombs, or the general eastern direction of prayers.¹

But with the further and more authoritative Biblical notice of the Great Pyramid, in the paragraph quoted from the marginally corrected translation by John Taylor,—describing indeed ostensibly the Divine creation of the earth, though under the

¹ Idrees, or Edris being, moreover, said to be a name among the Arabians for Enoch; traditionally, merely, the third with Adam and Seth in the invention of astronomy, and particularly connected with the polar star. (See *Mazzaroth, or the Constellations*, pp. 7 and 34, of Part II.; see also Howard Vyse’s vol. ii. pp. 342, 349, 358, and 360.)

figure, as he contends, of the mechanical foundation of the Great Pyramid,—there the description contains nothing sepulchral in its allusions; bearing indeed rather on metrology, and of a very signal and unusual kind, as thus :—

‘Where wast thou [the Lord answers Job out of the whirlwind], where wast thou when I laid the foundations of the earth? declare, if thou knowest (hast) understanding.

‘Who hath laid the measures thereof, if thou knowest? or who hath stretched the line upon it?

‘Whereupon are the sockets thereof made to sink (the foundations thereof fastened)? or who laid the corner-stone thereof,

‘When the morning-stars sang together, and all the sons of God shouted for joy?’¹

This description, if applied to the earth, that well-known ball of dense and heavy matter, revolving in its endless course through thin ether or practical vacuity,—is not only not exactly, but not in any degree, agreeable to the teaching of modern science; nor indeed to another account of the earth as a whole, and in its position in space, in Job xxvi. 7, where of God the Creator it is said :—

‘He stretcheth out the north over the empty place, and hangeth the earth upon nothing.’

Hence the presumption is with John Taylor, that in chapter xxxviii. of the Book of Job, we have the creation of the earth under a type of something else, more human, more understandable, and more practical; this type might be, indeed, in the earlier part of the description, the building of an ordinary

¹ Job xxxviii. 4-7.

house,—but the successive features elicited, the laying the measures thereof; the stretching a line upon it, as on its sloping sides, not vertical walls; and above everything, the one and final corner-stone, as contradistinguished from the lower corner, or foundation, stones at the commencement of the building,—these seem to single out a metrological Pyramid, of all other real or hypothetical buildings whatever.

‘The sockets thereof being made to sink,’ is evidently a most peculiar phrase; and would probably never have been fully appreciated, as it certainly was not correctly interpreted in the authorized Bible,—but for the perfectly independent discovery by Bonaparte’s *savants* in 1799, to the effect that the Great Pyramid had at least two such sockets, *i.e.*, at its north-eastern and north-western base corners. Sockets these were, neatly cut out, or ‘made to sink,’ with the chisel in the levelled surface of the living rock; and the foundational corner-stones of the casing, at these angles, were placed therein. An inimitable discovery was this, and never to be forgotten, though some great men do forget it; for at once those two sockets (so far at least as concerned the northern side of the Great Pyramid), enabled the measures thereof, as originally laid out in primeval times, to be recently recovered; and gave thereby the holding turn both to the theory of the Great Pyramid as being a metrological monument, and to the practice of the same, in showing it to be a good reference for base-line

measures still ; besides illustrating this terse Scripture phrase of 'the sockets thereof being made to sink.'

Hence, as we have ventured to express in our Dedication, the features thus discovered at the Great Pyramid,—by what one of Napoleon Bonaparte's politically opposed historians could only call, years after, 'a singular accompaniment to a military expedition,' viz., a corps of first-class *savants*,—these features, we say, are really 'not unalluded to in 'Holy Writ.'

By the Scriptures thus assisted and made plain to our comprehension, we ourselves concluded the further existence of other two socket-holes, making up four equidistant sockets for the four lower corner-stones of the base of the Great Pyramid ; and such sockets were found last year by the first person who excavated intelligently for them, as already described in vol. i. chap. xvii.

So much then for the four lower corner-stones at the commencement, and completing the foundations, of the structure ; and after them comes the final test of a methodically constructed stone Pyramid being alluded to, in another still, and therefore a fifth, corner-stone being mentioned. Though mentioned as being placed, not anywhere near the bottom or beginning of the Pyramid, but as forming its topmost corner or summit ; so that when that top corner-stone, emphatically *the* corner-stone, is laid,—the building is thereby finished, its symmetry

perfected, and in commemoration thereof, 'the morning-stars sang together, and all the sons of God shouted for joy.' Or, as in Zechariah iv. 7, where it is said that the 'bringing out the *head-stone* of 'the great mountain,'¹ was greeted with shoutings, 'Grace, grace, unto it.'

And now let us ask our readers, or our readers their hearers, how a series of men living in tents, as the Shemites of the period seem certainly to have done, were of their own experiences to acquire so much technical knowledge of the mode of building a stone Pyramid; and to grow in such righteous enthusiasm therein, as to look on its final completion with rejoicing ideas of pure and high religion, unless they were assisted by inspiration? And is it likely that acknowledged prophets of religious inspiration, would have employed again and again the features of a Pyramid head-stone (which they had never seen) as a symbol of the Messiah himself,—unless such a use of the figure should have been approved of by the Author of all inspiration?

And that such a use was made of the chief or top-most corner-stone of a stone-built Pyramid, by both the Psalmist of Israel, and the Apostles of the New Testament,—the late excellent John Taylor showed; for their words, said he, apply to nothing else.

Thus David, Psalm cxviii. 22 and 23, 'The stone 'which the builders refused, is become the *head-stone*

¹ 'The Great Pyramid, the nearest approach to a mountain that the art of man has produced.'—Dean Stanley's *Syria and Palestine*.

‘*of the corner* ; this is the Lord’s doing, and it is ‘*marvellous in our eyes.*’

And more particularly St. Paul, in Ephesians ii. 20, distinguishing between the lower corner-stones, which are the foundation,—and the upper corner-stone, which is the summit, head, and finish, and therefore the last, the noblest, and most essential part of the whole structure of a Pyramid,—but of a Pyramid alone, of all buildings under the sun, writes thus—

‘Ye are fellow-citizens with the saints, and of the ‘household of God ; and are built upon the *foundation* of the apostles and prophets, Jesus Christ himself being the *chief corner-stone*, in *whom all the ‘building, fitly framed together*, groweth unto an ‘holy temple in the Lord.’

The same stone, before its visible elevation to the chief or topmost corner of the Pyramid, has likewise been recognised as ‘the stone of stumbling and rock ‘of offence’¹ to all disbelievers ; physically, on account of its inconvenient, many-cornered figure, always lying on the ground, with one acute angle stuck up in the air,—untoward among the other regular-shaped, flattish building-blocks,—forming therefore the very image, according to John Taylor, of the dangerous stone, ‘on which, whosoever ‘shall fall, shall be broken, but on whomsoever it ‘shall fall’ (especially if it be from the top of the Great Pyramid), ‘it will grind him to powder.’²

¹ 1 Peter ii. 8.

² Matthew xxi. 44.

An early mediæval traveller, M. Belon, reports having been shown, in the valley of Jehoshaphat, near Jerusalem, the stone to which our Lord alluded in the preceding sentence, and states that it was 'triangular.' The mere general circumstance of a relic being shown in any Palestinian locality is usually thought now to be more against, than for, the probability of its genuineness. But in this case, the alleged triangular shape, which is a very usual popular method of describing a Pyramidal figure, is a curious coincidence at the least, with what John Taylor had concluded from his theory of a Pyramid topmost corner-stone ; and may have some connexion with mementoes of Egyptian experiences left behind them by Philition and the other Cusean shepherds, at the various spots which they inhabited for a time in South Judæa, and particularly in Hebron, before proceeding farther north.

Should the Cave of Machpelah, among its long-hoarded contents, ever reveal to Europeans such a pyramidal stone in good preservation,—there can be no doubt that scientific examination would be able to distinguish, with extreme accuracy and consequent certainty, whether it *could* have once formed the head-stone of the Great Pyramid or not. From the earliest times of history, that head-stone has been removed ; and one is greatly inclined to imagine that its removal may not have been altogether accidental, but that it will be rediscovered some day, a silent yet unimpeachable witness of

events which took place four thousand years ago ; and may have still to subserve a part in the history of the world.

Meanwhile, however, as this is only a fond hope ; and as we trust that proof has now been abundantly adduced, illustrative of the inspired authors of the Bible both having been familiar, in the spirit, with characteristic features of the foundation, construction, and finishing of the Great Pyramid ; and having looked on it with the utmost allowable religious respect,—making use of its similes for the noblest religious purposes known to Christianity, only ;—the argument of this last branch of our present subject, or that the Pyramid building in itself, and quite independent of any particular agency employed in its building, is owned and acknowledged in the Scriptures, both of the old and new covenants,—may be considered, like every other section in the chapter, to have been settled in the affirmative. Wherefore the next step should be, to take up the whole elements of the case, and endeavour to ascertain to what end, all these ancient facts and modern discoveries, culminating just at this time, may probably be leading. Yet for one moment more, and in the course of a very short chapter, we must request our kind reader's attention to the bearing on the case of one more item of lay learning, partly astronomical, but unfortunately not altogether so.

CHAPTER IX.

ON SOME POINTS IN PRIMEVAL ASTRONOMY.

Who invented the oldest Constellations?

IN preparing the star-maps of Plates VII., VIII., and IX., certain figures of the constellations were introduced, to assist the reader in identifying the stars concerned in the problem then laid before him. Such being the sole purpose, the figures were those ordinarily received in the present day; excepting only, that *Canes Venatici*, *Lynx*, *Camelopardalis*, and a few lesser asterisms, had been omitted, on account of their extremely modern European invention.

The other figures, however, which had been allowed to remain, although generally reputed 'the ancient constellations,' are not, for comparison with Great Pyramid astronomy, much more satisfactory than the above rejected ones; being to a great extent not older than the time of the Greeks, and in their present form, of the Alexandrine Greeks only. They were, too, even at that date, so evidently perverted in scientific ignorance and poetic presumption from a still older system, and one of more serious as well as solemn import,—as to give remarkable illus-

tration to that maxim of Scaliger, '*Græculorum est mentiri, et falsa veris affingere.*' Or, as the laborious Bryant feels compelled to write, after extensive investigations into the antiquities of history and geography,—

'Great part of the knowledge that we are possessed of, in relation to ancient times, has been transmitted to us through the hands of the Greeks; for which we are to make proper acknowledgment. But when we consider how much more they might have transmitted, and how foul and turbid the streams are that are derived to us, it takes off much from the obligation.'

And again: 'Sometimes they (the Grecians in transmitting primeval history) only translated the names of places; which was something tolerable; for there was then a chance of recurring to the primitive language, and recovering the original; as the meaning would lead one to the truth. But they were too vain to be consistent even in this; and what one advanced another confounded; each thinking that he had a right to change things, and new-model them to his taste. Above all things they strove to introduce their own gods and heroes; and to attribute everything to their performance, wheresoever transacted. Their vanity was so great in this respect, and their prejudices so strong, that it led them into a thousand childish errors; but, when they were not originally mistaken, they willfully deviated; imposing names on places, and

‘ adding legendary stories, which they must know
‘ were foreign to the countries where they introduce
‘ them. Hence we are informed that one branch of
‘ the *Nile* was denominated from a sailor of *Mene-*
‘ *laus*, and another from *Peleus* of *Thessaly*; that
‘ *Perseus* gave name to *Persia*; and that the *Medes*
‘ received their name from *Medea*; and what hap-
‘ pened on the occasion. For they were never guilty
‘ of a mistake, but they framed some story to support
‘ it.’ Or, as a more recent author puts it, a shade
‘ more philosophically,—‘ it was a part of the Greek
‘ character to frame systems on insufficient know-
‘ ledge, and to explain false systems by false hypo-
‘ theses.’¹

Unfortunately, in the present state of astronomy and literature, it is much easier to find proofs demonstrative of the Greek and Greek-Alexandrine constellations not having been first in the field, than to show what the more ancient system precisely was. With exceeding truth and judgment, therefore, the author of the article *Constellation* in the *Penny Cyclopædia* writes :—‘ It is sufficient for us
‘ here to say, that it is certain we derive our constel-
‘ lations from the Greeks, and that it is nearly as cer-
‘ tain that they derived them from the East, though
‘ it is highly probable that they altered the legends
‘ to suit their own mythology, and in some instances
‘ even the figures. Their firmament, if it confined
‘ itself to recording the vast and striking events of

¹ *Saturn and its System*, p. 194. By Richard A. Proctor, B.A.

‘their mythic system, as in Argo or Hercules,
‘might bear an external presumption of originality,
‘which it wants altogether while so prominent a
‘constellation as the Great Bear represents nothing
‘but the unimportant and irrelevant story of
‘Callisto.’

Even if we begin with known and scientific times not very distant from our own, we cannot feel greatly impressed with either the dignity in spirit, or worthiness of the objects, of modern constellation-makers. For thus writes the celebrated Hevelius, whom all men are now so content to follow, that they have placed his new constellations side by side with those which have descended to us of old :—

1st, ‘Because Bootes is regarded as a caller, brawler,
‘and hunter, who pursues the bear in hunting, and
‘raises his hand and arm as if in the act of slipping
‘his dogs, I could not find a more suitable place for
‘*Canes Venatici*. One of them I have called *Asterion*,
‘because the name is very pleasing to me, and is
‘well known to the poets. The other I have called
‘*Chara*, because most likely to Bootes, after the
‘manner of huntsmen, a female dog, on account of
‘its greater fleetness of foot, would be more *chara*,
‘or favourite.’¹

2d, ‘Of certain nine stars I have formed between
‘the Great Bear and the Greater Lion, a less or
‘junior Lion, and the reason was this :—I wished
‘to disturb the arrangement of the astrologers as

¹ From the *Prodromus Astronomiæ*.

‘ little as possible ; and seeing that the Bear and the
‘ Lion are usually considered the most violent and
‘ ferocious of animals, I put in between them an
‘ animal of the same order, that the stars of which
‘ it is composed might retain the same qualities.’

3d, ‘ The Fox and Goose (*Vulpecula et Anser*)
‘ constellation was made on this principle, that being
‘ composed of stars between the Eagle and Lyre,
‘ both of them over rapacious and voracious animals,
‘ it (the Fox and Goose) should pursue the same
‘ nature. This fox, then, has stolen a goose, which
‘ he carries in his mouth at a run to Cerberus, that
‘ three-headed, infernal, and devouring dog, by
‘ which he may have a breakfast and some comfort,
‘ before he is killed by Hercules, already raising his
‘ club for the purpose. Thus I have been able to
‘ locate the Fox and Goose in this position as appro-
‘ priately to the fables of the poets as conformably
‘ to the rules of the astrologers.’

The Lyre, though we all know it to be a perfectly innocent musical instrument, is here spoken of as a voracious animal,—because the mediæval astronomers made the Lyre a heraldic blazon on the breast of a certain ‘ falling eagle ;’ but the classical poem of Aratus, and a very ancient ms. in the British Museum, are generally considered to decide for the claims of the musical instrument, pure and simple ; while the Cerberus alluded to above has in most modern maps been replaced by a many-headed snake of small size.

According, in the next place, to a rather earlier authority, or Thomas Hood of Trinity College, Cambridge, in A.D. 1590 and author of a discourse on the celestial globe, the following is an explanation of the length of tail possessed by the Great Bear :—

‘*Scholar.*—I marvel why (seeing she hath the forme of a beare) her taile should be so long.

‘*Master.*—I imagine that Jupiter, fearing to come too nigh unto her teeth, layde holde on her tayle, and thereby drewe her up into the heaven ; so that shee of herself being very weightie, and the distance from the earth to the heavens very great, there was much likelihood that her tayle must stretch. Other reason know I none.’¹

If again we seek the earliest transmitted Greek legends of the same constellations,—we are told there, much of the amours of Jupiter with the frail Callisto ; of her metamorphosis into a bear by Diana for her breach of chastity ; of Jupiter saving her from hunters by transferring her to the skies ; and of her then component stars not being allowed, in describing their circumpolar revolutions, to dip below the horizon,—because the ocean deities refused to let their pure waters be polluted by the presence of the concubine of Jupiter.²

For the earth was at the time considered among the Greeks as being an extensive flat, reaching to the very heavens on the horizon ; while the *omphalos*

¹ Admiral Smyth's *Celestial Cycle*, vol. ii. p. 310.

² Sir G. Cornewall Lewis's *Ancient Astronomy*, p. 64.

or navel-stone, marking the centre of such earth-flat, was proudly shown in the temple of Delphi; to prove that Greece was in the centre of the whole world.¹

In fact all prosecution of the subject of the *constellations* amongst, or from, the schoolmen of the present day, up to and including the classic authors of Alexandria, Rome, and Greece,—ends only in shame of soul, vexation of spirit, and prejudice, probably, that even the most ancient, or pre-Greecian, constellations never had any noble meaning or scientific use. And as the author of *Mazzaroth*² says, on viewing the proceedings of one very learned man in this country,—‘Therefore it is evident that this great astronomer had not, in the course of his studies, met with any account of their (the older constellations’) possible signification which appeared to him worthy of notice.’

Hence a different track altogether requires to be taken, if we would arrive at an acquaintance with the primeval wisdom of the earth touching the heavenly constellations. And while the Great Pyramid has now recently proved that, quite agreeably with much of ancient tradition, such knowledge did once exist,—the author of *Mazzaroth* has for some years past, indicated that the most probable road to it would be found in the Hebrew language.

¹ Sir George Cornewall Lewis's *Ancient Astronomy*, p. 4.

² *Mazzaroth or the Constellations*. By Miss F. Rolleston. London, 1862.

‘For it is in the Hebrew antiquity alone,’—says that most learned linguistic writer, after deep researches into the most ancient forms of Hebrew, Arabic, and other Eastern languages,—‘in the Hebrew antiquity only, that we find any vestige of a received, connected, and respectable meaning being attached to the names of constellations.’ And as an illustration that such an improvement does take place there, besides there being in that language a higher antiquity to rest upon, than amongst any of the classics,—the same author proceeds to describe the signs of the zodiac as borne on the standards of the tribes of Israel,—and with meanings partly retrospective and partly prophetic attached to them,—in their, the Israelites’, march under Moses through the wilderness; besides claiming the same signs as being also alluded to in the blessing of Jacob, as early as 1700 B.C., or fully one thousand years before the Greeks were known as a people.

If too, we deviate at all from this well-marked Hebrew road, and try another very different language, though equally pre-Grecian, such as the Egyptian,—we lose sight of the early constellations immediately. For even that eminent Philo-Mizraite, Baron Bunsen, has been constrained to record, at p. 353 of his fourth volume of *Egypt's Place in Universal History*, that the signs of the zodiac were ‘wholly unknown to the Egyptians till the reign of Trajan.’ And although M. Arago and a few

other academicians used to believe in the extreme ancientness of the zodiacs at Denderah, Esneh, and elsewhere on the Nile,—the researches of all modern hierologists have united in fixing them to the later part of the Roman period only.

A claim, however, is put in by the learned M. Ideler, for the zodiacal figures, and perhaps some extra-zodiacal ones also, having been known to the ‘Chaldees, at a very early period;’ and we may fortunately pursue this important, though rather too indefinite, statement, a little further, by referring to Mr. Proctor’s admirable book on *Saturn and its System*, published in 1865. For that most original author, dealing with ancient as well as modern astronomy, feels compelled to look through the Chaldees of subsequent history,—when their astronomy was degraded to astrology, and they themselves were enslaved to do the will of Assyrian despots on the banks of the lower Euphrates,—and to trace the rise of their old characteristic science, as well as their own best days, to earlier times, when their Cusean forefathers enjoyed freedom and self-government, in a land situated somewhere about the fortieth degree parallel of north latitude.

This result, again alluded to in his ‘star-maps,’ Mr. Proctor deduces with much skill from calculations, which he bases on features taught subsequently in both the Greek and Hindoo astronomies; but features evidently not belonging to the dates of those systems, or even to those countries at any

time. Those countries were in fact only making use, and rather ignorant use, of the discoveries of an earlier age, another part of the world, and a different race of men,—or the Chaldeans; at that period of Chaldee history too, when they ‘resided’ in Armenia, between the rivers Cyrus and Araxes, ‘not very far from Mount Ararat; and at a date ‘somewhere between 2200 and 1800 B.C.’

Now these dates include the probable time of the Cusean and Chaldæan shepherd Philition, of Great Pyramid story, immigrating, perhaps returning, through Palestine to that same Armenian and Median region above indicated (chap. viii. p. 527), after his remarkable sojourn in the land of Siriad, or Egypt. And after his eventful occupation there, in superintending the construction of both an astronomically placed, and a generally scientific, building; in which, too, the chief metrological standards commemorated, were the same as those possessed in after days by the Hebrews,—as well when they went down into Egypt under Jacob (see Sir Isaac Newton on Cubits), as when they came up therefrom under Moses.

Hence, even from the metrology alone, there appears a something of possession in common between the early Chaldæan knowledge on one side, and the Hebrew on the other,—as to certain useful and accurate practical deductions from both astronomical and geographical science of a very high order.

But much more remarkably still does this con-

nexion come out in the astronomical part of the memorializations. For there, the Great Pyramid does, by its peculiar combination of a polar star,—taken on the meridian below the pole,—with an *opposite* zodiacal constellation above the pole, very remarkably single out for world-wide notice and time-long attention, the several asterisms of Scorpio, Aquarius, Pisces, and the Pleiades. Not only so too, but it assigns them to exact and precise dates; which, when combined with the Biblical history for the same period, vivifies and renders vocal the characteristic expressions of all those figures (p. 493).

Here then, is a wonderful agreement in mind between, (1.) the building of the Pyramid, (2.) the invention of the constellations, and (3.) certain grand primeval phenomena recorded in Scripture. The agreement too, will appear yet all the more striking, when we consider that there is no attempt made to assign any *physical* effects to the stars in these or all other constellations, and no endeavour to explain, in any manner, the *production* of the Deluge; but that the stars were taken as they were, and as they are still, by the architect of the Great Pyramid, and simply an observing method invented, by which they were made to fix certain dates. Similarly, too, the stars were taken as they were, by the inventor of the constellations, whoever he was or whenever he lived; and out of his mind (not from the arrangement of the stars themselves, for there is nothing of the kind traceable there), certain

figures were invented and attached to those stars. And there those figures have remained ever since, with a preternatural fixity ; for, with very little alteration at any time,—either of character, mode of action, or name,—they have outlived all the successive great monarchies of the earth.

Hence the date of invention, of at least the above specified constellations, cannot be less than that of the building of the Great Pyramid, or 2170 B.C., and may not improbably be more. Whether the learned author of *Mazzaroth* is justified, from the quarter of language and old tradition, in taking them up, through the survivors of the Deluge, to a very much higher epoch still, we are not prepared at present to give any opinion.

But having already laid before our readers both mediæval and Grecian ideas of certain well-known asterisms, it may be only right to exhibit also a specimen of the kind of results imagined to have been arrived at by the writer just mentioned,—when studying the same celestial phenomena from a mainly Hebrew point of view. We conclude this section, therefore, with Miss Rolleston's last page :—

‘ In the time of Seth and Enoch (the supposed
‘ originators of the ancient constellations under
‘ Divine inspiration, and for prophetic purposes of
‘ religious comfort to all mankind after the fall), the
‘ pole was among the stars of *Draco*, the emblem of
‘ the enemy ; the constellation of the Lesser-sheep-

'fold¹ had no relation to it. But by degrees the
 'pole drew nearer to the brightest star in that con-
 'stellation; the sheep represented by three of its
 'other stars, as quitting their earthly fold (the
 'believing Church) seemed going forth to the cyno-
 'sure, faintly typifying *Him* who was and is the
 'object of their faith. In the brilliant intensifica-
 'tion of this emblem of the fold and sheep going
 'forth, the *Greater fold* (now miscalled the *Great*
 '*Bear*), it is strikingly represented that their course
 'is to the Great Shepherd and Guardian of the flocks
 'typified in Arcturus, He who cometh and returneth.
 'The three stars, daughters of the flock, seem fol-

¹ Notes from *Mammoth*, pp. 29 and 30, on the Great and Lesser Sheep-folds, miscalled Bears:—

'It has been remarked by Oriental scholars, that the Arab astronomy
 'abounds with allusions to cattle, but without observing that the
 'camel, the peculiar possession of the desert tribes, does not exist
 'among the emblems. Only once, if at all, does even the name occur
 'among the more obscure names of minor stars, as it is said to do in
 'Cancer. Were proof needed that astronomy did not originate in
 'Arabia, this circumstance would afford it. The cattle with which the
 'nomenclature of the stars abound, are the lamb and the kid of sacri-
 'fice, the flock of the shepherd, the sacrificial ram and bull of the
 'zodiac, where the western nations still behold them; but besides
 'these are the magnificent emblems of the greater and lesser sheep-folds,
 'with their sheep, long obscured by fable and misconstruction of the
 'names by which they were originally distinguished—names perverted
 'by the Greeks and Romans, but still to be traced in the records of
 'Oriental astronomy. Most people know the remarkable constellation
 'called by some the Great Bear, by others the Plough, or Charles's
 'Wain. In reference to the starry host, the Book of Job mentions
 'Ash:—"Canst thou guide Ash and her offspring?" where the Eng-
 'lish has "Arcturus and his sons," according to the confessedly imper-
 'fect Greek translation of this most ancient and difficult book. It is
 'not, however, far wide of the real meaning in this place, as Arcturus,
 'though not in the same constellation, appears to lead or govern the
 'three stars, where we still find the name Benet-naish, the daughters

‘lowing, seeking Him; but two, representing the
‘boundaries of the fold, point above to the star
‘typifying Him in the earlier dispensation, *the*
‘*Lesser*, and as it were further removed *fold*. There
‘He, the Great Shepherd of the sheep, is figured
‘above, gone before; and below in Arcturus, as
‘about to return in greater glory. The foot of the
‘other figure, *the suffering Mighty One*, is on the
‘head of the Dragon below.

‘These emblems made part of the ancient astro-
‘nomy, but the guiding star was not the Pole-star
‘then, nor will it always be. Still, while to us it
‘seems to be so, it is well to connect it with Him to

‘of Ash, the assembled. The Arabs still call this constellation Al-
‘Naish, or Annaish, the ordered or assembled together as sheep in a
‘fold. The ancient Jewish commentators on Job, say that Ash is the
‘seven stars in the Great Bear. In the three stars, mis-called the Tail,
‘where we find the name Benet-naish, there is also Mizar, a guarded
‘or enclosed place. Another name is Alioth, the ewe or she-goat, near
‘which is the star celebrated in modern astronomy, Al Cor, the lamb.

‘Among other names in this constellation, El Acola also is a fold:
‘Phacad is a watched or guarded place; Dubhà, in Hebrew, a she-
‘bear, is still written on our globes; but in Arabic, Dubah is cattle,
‘and in Hebrew Daber is a fold, either of which might easily be mis-
‘taken for Dubhè by the Greeks, and understood as a bear.

‘In the name of the nymph Calisto, by Greek fable said to be
‘changed into the constellation, we find the Semitic root, which we
‘meet again in the west as Caula or sheep-fold. With the idea of
‘a sheep-fold in the mind, it needs but to look at these seven re-
‘markable stars to perceive how well is imaged there the fold, and
‘the sheep proceeding from the corner of it, as if following the bright
‘star Arcturus, always said to be the guardian of these stars, whatever
‘they might be called. Arcturus means, He cometh the guardian
‘or keeper.

‘As in Ursa Major, so in Ursa Minor, the Semitic names show
‘that here also were set forth the fold and the flock, in Scripture
‘metaphor the Church; and its chief star Al Gedi, the kid or lamb
‘of sacrifice; called also Arcas, the son of the Supreme Deity.’

‘whom the hearts of His people turn as the needle
‘to the Pole.

‘These leading or guiding stars, Arcturus in
‘*Bootes*, and Kochab or Cynosura in *the Lesser*
‘*sheep-fold*, have both symbolized the Great Shep-
‘herd of the sheep,—Him whom they follow in life,
‘and trust in, to attain to His side in departing to
‘be with Him, which is far better.’

Proposed Reforms among the Constellations.

Modern astronomers have little true love for the constellations, as usually accepted and fixed by modern public opinion ; for they are of no acknowledged use to *them* when actually observing, and have even become rather ridiculous in their eyes. There was a well organized and rather sweeping attempt a few years ago, headed by the first astronomer of the age, to reform those strange figures—at least for the southern hemisphere,—altogether. The outcry at the Astronomical Society was very loud ; ‘for,’ had said their intellectual leader, Sir John Herschel, in his *Outlines of Astronomy*, ‘the constellations seem to have been almost purposely
‘named and delineated to cause as much confusion
‘and inconvenience as possible. Innumerable snakes
‘twine through long and contorted areas of the
‘heavens, where no memory can follow them ; bears,
‘lions, and fishes, large and small, northern and
‘southern, confuse all nomenclature,’ etc. etc.

These were among the points, the reform of which

was to be attended to in future ; and the improved arrangement was therefore to have consisted, in dividing and subdividing the surface of the heavens by lines, defined for the most part by circles of right-ascension and declination ; names being given to such areas or sectional spaces, and also to the principal stars therein, culled from the neutral literary ground of classical antiquity and mythology ; on some well-considered general system too, so that the name of a star, or its section, should always give some idea of its place in the sky.

Had this attempt been successful,—it would have been a triumph to the furtive Greeks and their heathen gods and goddesses, who would have been thereby re-established with new force on the minds of all educated men. And it would have been creating greater difficulties than ever in the way of recovering the truly ancient constellations, or what came down to the Greeks from the purer light of primeval times ; and which they, before passing on for the use of posterity, sophisticated, metamorphosed, and mythologized, for their own and their false gods' glory. We are rather glad, therefore, that modern astronomy was not allowed to assist at so untoward an improvement ; though we must acknowledge that the arguments on which the attempted reform finally foundered, were not the right ones ; and are very little satisfying still, to the soul of the astronomer pursuing his science for itself alone. It was said, for instance, ' no modern im-

‘prover must presume to disturb an ancient discoverer, therefore the modern astronomer must not remove the long-established Greek names of both stars and constellations.’ But as we have just seen, the Greeks were not the original discoverers, earliest observers, or first namers of the stars and groups of stars; and for us to be keeping up *their* nomenclature, is only confirming the success of their unjust appropriation of the works of their predecessors; and approving their anticipatory fracture also of our well-considered rules and principles of just procedure.

Again it was said, and said triumphantly, in opposition to the proposed reformation, ‘that the existing system of constellations maintains the correspondence between the old astronomy and the new; while, moreover, the ancients having looked to the rising and setting of certain constellations, for their times of ploughing, sowing, sailing, and ailing, a general knowledge of the scheme is necessary for understanding their poets, historians, physicians, and writers *de Re Rusticâ*.’ But this apology evidently fails, in the first place, by, as before, not going far enough back on the stream of time to reach the real ancients; for Greek authors are the earliest ones alluded to in this extract: and in the second place, by indicating that the method of observing the constellations then in vogue amongst the Greeks, was so weak in execution and erroneous in principle, that no working astronomer

of the present day would care to inconvenience himself very much in his daily practice, for the sake of keeping up the glorious memory of such very poor ancients as those, in the matter of *practical astronomy*.

With whom rests the right to name, or re-name.

Especially too will this be the feeling among workers of the present day, when they discover that the much earlier races of men who really invented those constellations which the Greeks afterwards appropriated, had far more accurate ideas and more successful methods of making astronomical observations; for they observed stars, not at their *risings and settings*, but at their *meridian transits*. So that in times far before those of the Greeks,—the mere existence of this method at once indicates, that there were then a more exact astronomy, better knowledge of physics, and truer understanding of mechanics actually in practice, than that ingenious people of Hellas in after times ever possessed a notion of; in fact, an astronomy as much superior to the early Greek, as the primitive religion of mankind (whencesoever that might have been derived)¹ was purer than the Grecian mythology. We can indeed hardly paint in words sufficiently powerful the not decline merely, but the positive catastrophe, which befell the practice of astronomy when, from the hands

¹ See *Thoughts on the Doubts of the Day*, by the Dowager Lady Shelley: London, 1864; especially pages 16 to 20.

of those who *directed* the building of the Great Pyramid,—in part to commemorate the then polar star, equatorial star, and equinoctial point being all on the meridian together (see Plate VIII.)—it passed on to Phoenicians, Egyptians, and Greeks, to be by them employed not only on less well selected stars for chronological purposes ; but, on risings and settings, in place of meridian passages !

This method of *meridian* observation, which so signally marked the pre-Grecian astronomy of the Great Pyramid, and generally of the Pleiades year,—is a main feature likewise of modern astronomy ; even as we hope the worship of the true God, the God of the earliest patriarchs of old, is by the grace of God, the inheritance renewed of the present age. So that in seeking, on the score of astronomy, to produce an acquaintance between the earliest and latest times of man upon earth, we find a remarkable resemblance between these two chronological extremes ; for on each occasion, the true religion is accompanied by right and learned principles in the grandest of all the sciences. In the last instance indeed, the admirable meridian observation-method was arrived at by the slow development of human learning, gradually working its way through many thousand years of toil, towards the light ; but in the former, at least in the case of its chief practical manifestation, or at the Great Pyramid, it was accompanied by proofs both scientific and religious

of having been given at once, and suddenly, to chosen men by Divine inspiration.

This similarity in practical religion and observing methods in astronomy, of either end of man's career, or rather of his earlier, with the present age,—for when the end is to come we know not,—and the total contrast of both of them to all that has been prevailing among nations and people in the interval,—is strangely illustrated in the polar stars of the sky. We have now for the northern hemisphere, a good pole-star, α Ursæ Minoris, and the accuracy of modern meridional astronomy is greatly promoted thereby ; five thousand years ago, too, more or less, there was another good pole-star, viz., α Draconis, respectable in brightness, and inimitable for proximity to the pole ; but in all the intervening period there has been nothing to compare with either ; as may be instantly perceived on reference to our star-map, Plate VII.

We do not certainly pretend to know any sufficient reason why true astronomy should flourish only when the northern heavens show a good pole-star,—but it has apparently, somehow or other, been so as yet ; and though much is still talked in literature about Greek and Phœnician pole-stars, as used in navigation, they were from six to twelve degrees from the pole, and therefore mightily inexact if looked on as rotation-point references. Neither can we give the mariners of those nations all credit for making the best possible use of what nature placed

at their disposal in that age of the world ; for if, as Chevalier Bunsen states,¹ the Phœnicians employed β Ursæ Minoris, under the name of Astarte, Has, and Hastoreth, queen of the Zidonians, for their polar star, as early as 2000, or even 2200 B.C.,—making as much use of it, and regarding it as holy to them, as the Egyptians did of Sirius to themselves for their ends and their purposes,—we can only say that the Phœnicians did not take the best star, seeing that α Draconis was then at only half the distance from the pole that β Ursæ Minoris was ; and this last star, never even in subsequent years came within some six degrees and a half of the rotation point of the heavens.

Chevalier Bunsen indeed contends in favour of the Phœnician preference, that α Draconis could not compare against β Ursæ Minoris in the matter of brightness ; for according to him, the latter star was of the first magnitude, ‘the brilliant one of the *first* magnitude, Beta of the Little Bear,’ he writes (vol. iv. p. 350) ; and again, ‘this same ‘brilliant star β .’ But we are quite unaware of his having the smallest authority for asserting that that star was ever above its present size, or of the *third* magnitude only ; and as a little further on, he makes the star belong to the *Great Bear*, we fear that this part of his text, whether by printer’s error or otherwise, is not much to be depended on.

¹ *Egypt’s Place in Universal History*, vol. iv. p. 353.

*The Constellations as means for perpetuating
Ideas.*

But while we are thus showing the similar stellar facilities for exact astronomy, which the heavens of five thousand years ago, and these alone in all time past, were offering in their day,—to what they are again affording now ; and the similar ideas which then prevailed amongst men as to the best method of making astronomical observations, for either the absolute fixation of place, or accurate determination of time,—with what are newly approved of in the world at present,—we are involuntarily affording grounds for an argument, and one of no mean importance, for the continued use of constellation arrangements of some kind.

The modern astronomer in a meridian observatory, working on from year to year, finds the right ascension and declination of a star, spite of the small alterations by precession in such short lengths of time, to be abundantly sufficient, and even very convenient, both for distinguishing the star as by a name, and for directing a telescope to its place in the heavens. But when the most important question for solution, both by that observer and all astronomers, comes to be, the connexion of the present astronomy with that of four thousand years ago,—then, right ascension and declination will neither serve the purposes of a name, nor the uses of a ready finder ; for truly we may say, *α* Draconis we know, and the

Pleiades we know,—but who are right ascension 12h. 4m. 26s., with declination $85^{\circ} 18' 0''$, and right ascension 23h. 58m. 45s., with declination $4^{\circ} 11' 55''$? They are certainly not the present places of the previously mentioned stars, even to the most approximate naked-eye observation; for these places are respectively, right ascension 14h. 0m. 46s., with declination $65^{\circ} 0' 53''$, and right ascension 3h. 39m. 31s., with declination $23^{\circ} 41' 17''$; yet are the former very diverse numbers the places after all of the self-same stars about four thousand years ago!

Although these vast variations of numerical positions, would be lessened by adopting ecliptic latitude and longitude in place of right ascension and declination,—the movements of the plane of the ecliptic, in periods so enormous as four thousand years, would prevent such variations disappearing altogether, besides introducing many other inconveniences; but the 'Pleiades in the shoulder of the Bull,' remain in that situation age after age, without any sensible change. Hence, if any one had wished to preserve the same names of the stars, and hand down the same ideas unchanged on certain subjects from primitive man to the most distant posterity,—he could not have selected amongst all objects in nature, anything so appropriate and so permanent as the constellation figures of the stars.

As we have these figures now, puerile and absurd though many of them, after repeated altera-

tion, may have become,—they have lasted some two thousand five hundred years or more ; and have been employed by hundreds of thousands of millions of men. But in proportion as we are enabled, and the Great Pyramid *has* now enabled us with several of the constellations, to rise above those adventitious accompaniments which mediæval nations introduced, —so do we find the original figures bring us at once into mental companionship with those who lived five thousand years ago, and even with some who enjoyed the privilege of Divine inspiration.

‘ From the names and emblems of ancient astronomy,’ says the author of *Mazzaroth*, referring to the meanings of the words describing the constellations in a primitive language, and confirmed now very remarkably, in some cases (see p. 493), by the Great Pyramid,—‘ we may learn the all-important fact, that God has spoken ; that He gave to the earliest of mankind a revelation, equally important to the latest ; a revelation even of those truths, afterwards written for the admonition of those on whom the ends of the world should come.’

If it be true, as the late lamented Dr. Arnold remarked, ‘ that modern history is not only a step in advance of ancient history, but *the last step*, and appears to bear marks of *fulness of time*, as if there would be no future history beyond it,’—then every symptom of the extreme beginning being brought by a higher power to be compared with the latter end, and the intervening clouds and mystifications

of heathen nations passing away as a tale that is told, becomes of most intense interest.

But it is time now, that we should leave this single question of the ancient constellations, their origin, character, and meaning,—for a broader consideration of the *whole* contents of that most authentic book of primeval science, which the Great Pyramid proves itself more or less in essence to be.

CHAPTER X.

INTENTIONS AND PURPOSES OF THE GREAT PYRAMID'S MANIFESTATION.

IF, in the course of volumes i. and ii. of this work, we have now succeeded in showing, that both the grandeur and stability of the Great Pyramid, as well as the minute perfection of its parts, are a marvel to all practical working men ; and if we have also been enabled to prove in Divisions I. and II., and the earlier chapters of Division III. in the present volume, that the original metrological and chronological plans,—in memorializing which after a permanent manner all that unrivalled amount and unequalled skill of workmanship were spent ;—that those original plans, we say, must have been based on a knowledge of astronomy, geography, and physics, so vastly beyond the powers of unaided man in the day when the Pyramid was built, or indeed within several thousand years therefrom,—that scientifically there is no resource for us, but to allow that the planners of the building must have been assisted by Divine inspiration ; and if we have also been

able to set forth in chapter viii. of Division III., that there are both good historical, and sound religious reasons for believing in such Divine inspiration having actually been afforded, or rather perhaps, that Divine commands were given for the work,—then we are arrived at the threshold of a more difficult question still;—viz., why a divinely originated system of weights and measures, should have been constructed in the earlier ages of the world, to be made known to man only at the present latter day? Or, as others choose to express it,—‘if the ‘Pyramid system be really all that has been represented, why was it locked up for so many ages, ‘instead of being published as speedily as possible, ‘to confer its choice advantages on men of all ‘times?’

This form of the question travels, we fear, beyond its legitimate ground; for, on the principles apparently taken for granted, men might equally well inquire, why sundry events appointed to special times in the Biblical history of the human race,—were not carried out earlier; especially when St. Paul tells us, that they had been prepared from the beginning of the world. But such principles being evidently erroneous, in a religious point of view,—all inquiries based on them would prove to be in vain. Our time will therefore at present be more safely, as well as more profitably, occupied in investigating,—not why the Great Pyramid metrological system was not published sooner,—but in ascertaining what are

the *accompanying* features observable in the world in our own times, when the publication is at last apparently taking place; and in endeavouring to apprehend what wants of humanity may thereby be supplied, what purpose served, or what good promoted. There are, too, several proposed solutions of this part of the case, already in the field, and highly deserving of attention.

Solution 1?

The first of these proposed solutions says—If the Great Pyramid is—throughout every part of its building—a monument devoted to memorialize a system of weights and measures, it must have been intended to be *used* as such; and if the standards of its system are based on grand earth-features common to all nations alike, giving to no one people an advantage over another,—the system must, by the logic of facts, have been intended to be a universal one, and to be employed by all nations.

This universality is further contended for by the same party, on account of the geographical position of the Great Pyramid in *Egypt*; which land, ‘situated between Africa and Asia, and in easy ‘communication with Europe,’ was long ago described ‘as the centre of the ancient civilized world;’ and has been more recently computed by modern science, to be the effective surface-centre of all the inhabited regions of the globe taken together, and treated according to the number and importance of

their populations. Wherefore, if the special question is then put, as to why so admirable and universal a system is only just now produced,—an answer comes to the effect—that mankind was not prepared for general peace and universal brotherhood sooner; and under these social circumstances alone, can one system of weights and measures ever be expected to obtain all the wide world over. Steam-navigation, railway-travelling, the electric telegraph, universal expositions, and international commerce, are now progressing at such accelerated pace, it is contended, that one weight and one measure will soon be required for the merchant princes trafficking over a whole world; and here, just at this very point of time, the Great Pyramid,—situated precisely at the crossing of all the many roads employed by modern commerce, in passing between the East and the West, the North and the South,—has disclosed its system—the most universal in its arrangements and the most scientifically founded in its standards of any that has yet appeared; leaving even the metrical system of the French *savants* a long way behind it. What, then, can the Great Pyramid system be disclosed for, it is argued, at this juncture, but to supply the new wants of humanity, and herald in some of the accompaniments of the promised millennial peace and good-will to all men?

In answer to this statement, it must be confessed, we imagine, that if there is ever to be one weight and one measure for all nations, the Pyramid system

would be the fairest and best ; and is in so far worthy the earnest attention of all good men who look towards the future, and desire the ultimate benefit of the whole human race. But we are not sure that the occasion for such a system as painted in the last paragraph, is likely to occur for an indefinite length of time yet. Sager persons than ourselves have doubted long since, whether the growth of mere material prosperity and increased means for driving the wheels of commerce faster than ever, *are* of themselves doing much for peace and good-will to all men. Wealth is accumulating in special localities and for the few, much more rapidly than of old,—but the poor remain as miserable as before. A commercial treaty with a new or weak people, is soon followed up by an armament. Insurrectionists carrying fire and sword with them in one country, are contributed openly by the citizens of another pretending to be at peace with it ; and in the very centre of Europe and learning, wars are plunged into, neutral nations invaded, non-combatant peasants maltreated, and hecatombs of fighting men are slaughtered with far greater speed than in any earlier epochs of the world, and apparently with less compunction on the consciences of the slaughterers, regal and subject alike. So that, whether by crowned kings, or arrayed nationalities, or needy political conspirators,—war, in this year of grace 1866, is levied at a moment's notice or without it ; man's blood is freely taken by his fellow-man ; not

a nation considers itself safe except surrounded with its armed hosts, more numerous than at any previous stage of its history, even in open war; and every new invention out of which peace had been expected, has been turned to increase the destruction of battle; while in the eyes of the people at large, success in war, whether just or unjust, has been recently held to take the place of charity in absolving their rulers from every sin, whether of commission or omission, against the laws and institutions of their country.

In presence then of this scene, which the Germany, Bohemia, Italy, Poland, Canada, Mexico, Crete, and even Siberia, of the year 1866, are exhibiting; and in presence of this failure of mere human learning and modern science to put an end to wars and the tumults and destruction of war,—we must express our entire dissent from the supposition of the disclosures of the Great Pyramid metrology having been *intended* to be so timed, as to greet a state of general amity and peaceful communication already existing, and accomplished by themselves, amongst all mankind.

Solution 2?

Well, remarks another solutionist of the case—granted that the revealing of the Great Pyramid's long-kept secret, was not intended to greet a general peace already accomplished over the earth by man,—but why should it not have come to enable him to

accomplish so great a good, by supplying to his hand such a general means for universal amity, as a system of weights and measures, calculated to be, and worthy of becoming, universal to all mankind?

To this question, probably, many persons besides ourselves will be inclined to answer,—that any new instrument suddenly put into the hands of man, as man merely, is not likely in the next few years to have a totally different effect, from all his previous proceedings and developments during the last four thousand years. He has indeed now, and has had for many centuries, the gospel of Christ to assist him in his endeavours after what is right. But it is even with its assistance, as already described, that the so-called peace-establishment of Europe has grown to be something like four millions of armed men. According to gospel principles, too,—as further abundantly shown in the antithesis, by Egyptian history,—no further assistance from the same quarter need be looked for, until there has been full confession on man's part as to his total inability, of himself, to *make* a reign of general peace and good-will over the whole earth,—any more than to work out his own salvation.

How, too, is such an instrument, or one pretending to the same character of a universal metrology, but not from the same source,—being used at this very moment? Why, we are told in the public papers, that Napoleon III., seeking recently to join the South German States to France as a counterpoise to

the late agglomeration of North German States about Prussia,—proposed to them to adopt the French metric system, in place of their old hereditary weights and measures. And we are also informed, that the said South German States fired up with indignation at the proposal; looking on it as neither more nor less than a proposition to them, to abandon everything national and traditional that they had derived from primeval times,—and to become Frenchmen: Frenchmen, too, of the order of those amongst whom the metric system was produced, who publicly as a nation abolished religion and set up atheism, in their capital city, and finished with consigning all their liberties to a military despotism.

Solution 3 ?

Then says a third solutionist,—All the alteration needed in the last proposition is merely this,—that the revealing of the Pyramid's information is to help man to do, what he would never have been able to bring about by his own powers.

There is a very great deal though in that alteration, if it really comes from the Christian heart. We might then too take account, of the unexpected and confirmatory light which the Great Pyramid has thrown,—not only on the question so disputed amongst Churchmen, and in which they were not receiving any more light by the progress of their disputations, viz., as to whether the Sabbath had ever been heard of in the world before Moses ;

—but also on the reality of the still more widely disputed, we might even say, of late, generally doubted, phenomenon of the Noachian Deluge. And any further insight whatever into these things must be of extraordinary importance, and possess a ramifying influence through many departments of religious life and progress.

But the main substance of the Great Pyramid, so far as at present ascertained, is metrological; and though we must confess to be quite unable to see our way as to how its system is ever, notwithstanding all its excellences, to become universal amongst men under the present dispensation,—yet we fancy that there may be traced another part which the Pyramid standards are actually fulfilling; and not so much in combining, as in singling out, or rendering more distinct, both certain classes of men and particular characteristics of nations.

Solution 4?

Of olden time, all the mental and physical distinctions between Hebrews and Egyptians, sacred and profane, revealed religion and man-invented idolatry,—were in a manner typified to the eye under the different lengths of the cubits of the two nations. Each of those nations keeping to its own cubit faithfully or pertinaciously; and thereby still further illustrating their inmost thoughts and even principles of action. For the one people adhered to their 25-inch standard, because they believed

that they had been taught by inspired prophets to observe it as a duty appointed of the Lord their God;—while the other people kept to their 20·7-inch standard, merely because it was a species of custom amongst themselves; and, if traditionally traced up, through the Flood, to Cain, and to his invention of it merely as a means of hasting to be rich at the expense of all his neighbours,¹ they saw no particular objection in that.

In later times, however, a third party has appeared on the metrological field, evidently diverse from either of the former; for while it repudiates the *mere* mammon-acquiring character of the last example, it pronounces still more strongly against the revealed religious origin of the other. This party is, of course, that which originated the French metrical system; whose 39·37-inch metre standard was expressly brought out as the product of modern science alone; and as being infinitely more grand in its earth-commensurability, and more ennobling to the soul of man to contemplate, than any other previously known national measures.

But the introduction of this third system on the scene, instead of either confusing the distinctions of the other two chief systems already in possession of

¹ 'He, Cain, augmented his household substance with much wealth, by rapine and violence. . . He also introduced a change into that way of simplicity wherein men lived before; and was the author of measures and weights; and whereas men lived innocently and generously while they knew nothing of such arts, he changed the world into cunning craftiness.'—Josephus, Book i. chap. ii.

the ground, or throwing them both hopelessly into even shade,—has only made them more broadly and visibly diverse than ever : while it has more especially invested the Hebrew system with new claims to admiration ; and such as can be shared in by the whole educated Christian world of the present day. For now has it been discovered,—and mainly through the Pyramid investigations,—that not only does the ancient Hebrew standard possess all the earth-commensurabilities claimed for the French metre,—but it possesses them in a far higher spirit and of a purer kind : while the Egyptian has nothing whatever of the sort.

Hence we might arrange the three systems, or Hebrew, French, and Egyptian,—as representing, best earth-commensurability, indifferent earth-commensurability, and no earth-commensurability at all. Or by looking to what lies at the grounds of the reasons for their having such qualities,—they might be taken as representing attention to the dictates, or a giving way to the domination, of, revealed religion, modern science without any religion, and old idolatry. This, too, will probably be the more instructive manner in which to look at them ; for it illustrates strikingly the direction of the progress of society at the present time, and the principles under which both individuals, and even nations, are now classing themselves.

The carrying out, however, of so general a review of the whole world, is for other minds than ours, as

well as for works especially devoted to such questions. Here, we merely attempt to elucidate the subject of the Great Pyramid, so far as may be in our power, or may lie within the compass of a moderate practical astronomer's professional employments,—leaving many other sides of even the Pyramid question to be prosecuted hereafter by other men better adapted therefor. Hence there remains now but one topic which falls within our province to attempt; but this has so much of both home interest and national importance about it, that we do not scruple to ask the reader's attention for a few minutes longer.

Anglo-Saxon Originals in Metrology.

Not only have we shown, in the last pages of vol. ii. and in chapter viii. of this volume, that the sacred Hebrew and Great Pyramid standards of weight and measure may be regarded as identical,—but we have had again and again to point out, that the Anglo-Saxon measures come, in many of their features, so exceedingly close to the above, that the coincidence cannot be accidental. This fact had not escaped John Taylor, nor indeed the anonymous author of the Pyramid book of 1706 (see p. 117),—but they had not advanced very far in ascertaining whence, or how, so remarkable a triple agreement arose amongst three nations or parties now widely removed in both time and geographical limits.

We ourselves have indeed set forth already, in

chapter viii. and elsewhere, reasons for believing that both the Great Pyramid and the Hebrew measures were communicated by inspiration ; at very various times in history, but from the same eternal, all-wise, unchanging Source ; and *therefore* they are found to be the same, or, that *continuity* prevails with regard to them.

But in such case where, how, and when did the Anglo-Saxons receive their traditional and hereditary measures ; so closely alike, that they must either have been copied from one or other of the above,—at a date something more than two thousand years ago,—or have been similarly derived from the same high and original Source as theirs. This latter idea will probably be forbidden by every one, or found by them without any proofs to support it ; while, again, the Great Pyramid was a sealed book to all the world, until this present day, when modern science,—aided in part by the dilapidation of the building and the structural features thereby opened up,—has at length been able to assign the chief interpretations. There remains, therefore, only the Hebrew origin as likely or possible ; but still extremely distant as well as difficult, and partly because so little is known of the Anglo-Saxon race at any very early dates.

Anglo-Saxons, where from, of old.

At present, indeed, we all appreciate the name as applying to a majority of the inhabitants of Great

Britain and the United States, with their roots among the Scandinavian, German, and Gothic populations of the Continent; but the Anglo-Saxons are no more the aborigines of these European, than of the American, countries where they are now found. They came, indeed, confessedly, according to all history, to these regions from the eastward, within the last eighteen hundred years; and if we inquire of the ethnologists what all the Anglo-Saxon, Scandinavian, German, and Gothic nations are called in their science, we are told 'Indo-Germanic,' or that they all had an eastern and southern origin.

This subject has been followed up more particularly by Mr. John Wilson of Brighton,¹ for the English-speaking races of the Anglo-Saxon, with some remarkable results; one of the first being, that though in the dark ages constituting a part of the Gothic immigrating hosts, and in so far Goths, with whom we are accustomed to connect everything barbarous and savage, they, the Anglo-Saxon portion, and some others too of the Goths, were not savages; but had, on the contrary, the physiological testimony—in large well-formed brains and fine hair—of a race long nurtured in superior intellectual and social culture, besides political proofs of the same in the possession of very complete and wisely devised systems of laws, with orderly manners and customs.

¹ Especially in his monthly serial of 1866 and 1867, entitled *The Watchman of Ephraim*. See *Language as a Criterion of Race*, p. 202, and other papers.

That all Goths were necessarily barbarians, is an idea that has grown up from our first descriptions of them having been unfortunately written for us chiefly by their enemies, whom they were conquering; viz., the pampered and enervated sons of Rome in her decline and decrepitude. To such luxurious debauchees, the simple and regularly-living Goths were of course mere so-called savages, and yet might be more highly appreciative of moral virtue. While as for artistic feeling, and in architecture, where the Romans did little else than servilely follow the Greeks, the Gothic peoples produced an entirely new variety of the art; and so exceedingly exquisite as to oblige all the present world, by the fact, to use the name of Gothic in connexion with the beautiful, just as systematically and frequently as erroneous literary and Roman-derived prejudices have hitherto made us inclined to appropriate it also, to everything the very opposite of beautiful.

The Anglo-Saxons, then, are not, as a Jewish author lately tried to make out, a mere recently sprung horde of northern savages, emerged only the other day from a mud-hole in a German forest; but a race who had been already long accustomed to virtues and refinements in some land, said by the ethnologists to be south and east of that which they now occupy; and of that one also where they first appeared to astonished Europe in the midst of carrying out their great military migrations in the several centuries following the Christian era.

What was the country, then, whence the Anglo-Saxons started on that occasion? This is the second point on which Mr. Wilson has reached some most noteworthy results, and by the method of language, applied in a very safe and thoroughly inductive manner; for he distinguishes the traces of the original foundation of a language from the often very numerous facts and sometimes preponderating mass of substance introduced into it at subsequent times; an effect witnessed to the utmost degree in the present day on the Jews in Russia, who all speak German, not because they are of the same original race and stock as the Germans, but because they sojourned in the cities of Germany for several centuries in the middle ages before going to Russia.

The chief importation of this nature which Mr. Wilson finds in the Anglo-Saxon, is from the Persian or Median. In this conclusion he was indeed preceded, as he also acknowledges, by Sharon Turner, and many other writers on the Germanic and Scandinavian languages and peoples.

In so far, indeed, there is nothing contradictory either to ancient tradition or modern science, in deriving the Anglo-Saxons, with some portion of Scandinavians, Slavonians, and Germans, from Persia or Media, as one station merely of a more extensive journey, either by the southern or northern route from thence. In fact, the generally acknowledged theory of the German philologists, given expression to in Bunsen's third volume of *Egypt's Place in*

Universal History, p. 459, brings the modern Germans from further east still than Persia or Media, or from what he terms 'the primeval land, Iran 'proper, *Airyana Vaego*,' or the high land about the sources of the Oxus and Jaxartes, between the fortieth and thirty-seventh degrees of north latitude and eighty-sixth and ninetieth of east longitude, or in Eastern Central Asia ; that, says he, was 'the aboriginal Iran proper, inhabited by the fathers 'of the Arians (and consequently our own, as we 'speak the same language.')

But Mr. Wilson does not trace up the Anglo-Saxons,—before they arrived in Media and Persia,—to that primeval land of the Arians ; nor to an intervening residence in the Indian Punjab, whereto Chevalier Bunsen traces his own more immediately connected portion of the great Indo-Germanic peoples. On the contrary, Mr. Wilson finds a separate and distinct line of experiences for the Anglo-Saxon tribes, which begins with traces of greater proximity between the Anglo-Saxon and Persian, than between any other modern European language and Persian ; implying for the Anglo-Saxons, and perhaps also the Danes, a longer residence in that part of the world, than for the majority of the Indo-Germans. This remarkable fact, fairly arrived at by an inductive examination of the languages, forms an apparent anomaly in the general ethnological problem, of the highest importance as such, for any philosophical mind to trace up to its

source and explanation. And Mr. Wilson does follow it up further, showing satisfactory indications, after eliminating the Persian and Median imported additions, that there is a small portion of Egyptian or Coptic similarly imported; but that the structure and foundation of the language is Hebraic; one of his closing paragraphs having the following words, 'indeed, *the basis of the English language may, to a remarkable extent, be found in the Hebrew.*' 'Many of our most common words, and names of familiar objects, are almost pure Hebrew. I have observed this particularly with regard to the Low-land Scottish.'

Not only, too, does Mr. Wilson show that this Hebraic foundation of our language could not, as such, have been introduced into it by our copying from the Jews subsequent to our Persian and Median period of residence,—and since the time that the Jews, expelled from Jerusalem, have been a homeless people, scattered abroad amongst all nations,—but he further shows that the Hebrew of the English language specially appertains to one tribe of Israel, who never belonged to the kingdom of Judah at all, and were never therefore to be termed Jews; a tribe, indeed, which formed the head of the historical opposition to Judah, viz., Ephraim,—with its capital city of Samaria, and the kings thereof, usually termed Kings of Israel.¹ Hence the Hebraic por-

¹ As an illustration of what the Ephraimite feature of the Hebrew was, the reader may be reminded that the Bible mentions (Judges xii.)

tion of the Anglo-Saxon language may be called either Ephraimite or Israelite with historical truth, but never Jewish.¹

Now, this is without doubt a very capital point; because as clearly as extensive linguistic connexions can make them so, and agreeably with all the principles of language applied to ethnological science,—and which indeed seldom has such broad and ample foundations to work upon, in its ordinary discussions and conclusions,—the Anglo-Saxons are shown to

that the men of Ephraim could not say *Shibboleth*, but only *Sibboleth*; Samaria also for Shemar; and Mr. Wilson gives the following list of English words derived from the Hebrew, but by an Ephraimitic road, or a dropping out of the difficult 'h' after the 's' at the beginning of the word.

English Word.	Hebrew Word.	Meaning in English of the Hebrew Word.
Sever,	Shaver,	To break or tear.
Sabbath,	Shabath,	To rest.
Sad,	Shad,	Desolation.
Scaith,	Schacath,	Destruction.
Steep,	Shatap,	To drown.
Slake,	Shalak,	To lay.
Saim (fat of swine), .	Shaman,	Fat.
Son,	Shanah,	Repetition.
Sift,	Shafat,	To judge.
Speak,	Shpak,	To pour out.
Soak, suck, sack, .	Shakah,	To give water.
Scale,	Shakal,	To weigh.
Settle,	Shathal,	To plan.

¹ For the correct use of the terms *Israelite* and *Jew*, see Mr. John Wilson's many publications; where, founding on a most extensive study of the appropriate portions of Scripture, he has been able to define the terms almost with the rigidity of mathematical demonstration,—and at the same time to give more expressiveness to the histories of these two most diverse and hostile nations, though they did, indeed, at one time march together under Moses, and were both originally sprung from Israel.

be compounded of the very Israelite people of old ; in fact, they are the representatives of those Israelites, or may be said themselves to be of Israelite descent ; and therefore heirs of whatever portions of Hebraism were retained, when the more particular *religious* rites of Mosaicism were abolished and superseded by Baalim, under King Jeroboam.

This is the conclusion from the side of language ; and is remarkably confirmed by history. For the Israelites were carried away captive from Samaria some two thousand five hundred years ago ; and though they have been lost to sight, as such,¹ ever since,—yet it is known (see p. 528), that they were taken northward to the cities of the Medes, and beyond them still. Whence, excepting some very few stragglers, they not only never had any opportunity of returning southward to their Palestinian land,—but they found themselves compelled to move away westward, in that grand current of the human race, by which their then surrounding neighbours, the Arians, Germans, and subsequently many other nations, were in long ages perpetually passing on towards Europe ; and never stopped until, in the fourth and fifth centuries after Christ, they had reached the westernmost coasts looking upon the Atlantic. Mixing then with these nations,

¹ Mainly because they have always been looked for as Jews, or a people with Jewish institutions, and *those* distinguishing religious rites of the Mosaic creed,—which they, the Israelites, had most formally abandoned, and made particular war against from the instant that they set up their separate kingdom.

—the Israelites, always a people of strong vitality,—must have prospered in mere numbers ; and if the two tribes of Jews in the present day have eight millions of descendants to show, in spite of all their sieges, wars, and persecutions,—and the continual filtering away also from amongst them of their best minds by conversion to Christianity, and subsequent amalgamation with their European neighbours,—the Israelites, could they only be recognised, ought to have with their ten tribes, no less than forty millions. A large amount of leavening to be introduced amongst the present or mediæval inhabitants of Western Europe.

This conclusion, however, of who are the Anglo-Saxons,—viz., a people largely partaking of Israelite admixture,—although it is something of infinite mystery to man, seeing that its chief facts and phenomena ascend to ages far beyond the powers of any Heralds' Office, or the genealogical rolls of the proudest aristocratic, or even royal, family of Europe, to presume to say anything whatever about,—this conclusion, we say, making out a lineal descent for the mass of the nation during no less than two thousand five hundred years, and then attaching them to the most favoured branch of all mankind, and the longest known to history,—has further and most remarkable testimony afforded to it from the Scriptures.

Most ably, and with eminent success, has this side of the general question been treated by Mr.

Wilson, in the several works mentioned below;¹ to such an extent, indeed, that not only would it be uncalled for in us, to attempt to throw any additional ray of light upon its foundations;—but we rather believe that there are contained already, and introduced unintentionally, perhaps, in Mr. Wilson's works,—arguments, illustrations, and indications quite sufficient to help forward all religiously inclined minds, towards appreciating not only how the Anglo-Saxons are now found in popular possession of both old Hebrew words, and the ancient Hebrew metrological standards,—but why there should have been Divine inspiration afforded for the first establishment of the Great Pyramid metrology,—and why also it was sealed up in such impenetrable mystery from the time of its primeval realization, to be opened and appreciated only in these latter days, in which we live.

Nevertheless, there is one part of the question which is so purely in the way of inductive inquiry on metrological grounds,—that it seems to fall within our positive duty to attempt,—and we make its study therefore the concluding portion of our book.

¹ *Our Israelitish Origin.*

The Book of Inheritance.

The Millennium.

The Mission of Elijah.

The Watchman of Ephraim (Monthly).

By John Wilson, 34 Norfolk Road, Brighton; and published by W. Macintosh, 24 Paternoster Row, London, E.C.

Metrological Test of the European Races.

The case may be stated thus,—

If the Ephraimitic Israelites are mixed up in all the nations of modern Europe,—and if it is through the former having preserved their old Hebrew standards (as well as many other of their Hebraic peculiarities—though not all, for causes explained by Mr. Wilson in the works already quoted) ; if it is for these reasons that the now hereditary weights and measures of the said nations are found with so many resemblances to the Hebrew (or the Pyramid standards, which are the same in principle, and more accessible in fact),—then the resemblance ought always to be closer and closer, according to the amount of Ephraimitic blood in each nation. This is evidently only concluding from weights and measures, what has already been deduced from language, and with highly approved results in all educated society. We at once, therefore, proceed to consider, which of the metrologies of modern Europe, comes closest to that of the Great Pyramid.

Now, the metrologies to be discussed in such a case, are, as with the languages previously considered, the popular ones ; or those commonly employed by the mass of the people of each country. We turn, therefore, for information upon what they are,—not to any deep or difficult treatise upon the arcana of science, as understood, and understandable only by

a few philosophers;—but to some book of common information for all classes of society. Many such works there are before the public; and among them, few are more commendable for the care with which it is compiled, than that excellent literary, commercial, and general intelligencer, the *Edinburgh Almanac*, by Messrs. Oliver and Boyd. We consult its well-filled interior, accordingly, and find, on page 83, the popular weights and linear measures of each country given in a compendious form, and apparently accurate manner.¹

Each of these several weights and measures we then compare with the Great Pyramid standard weight and measure; viz., the Great Pyramid pound weight, equal to five cubic inches of the earth's mean density; and the Great Pyramid cubit, equal to one-tenth-millionth of the earth's semi-axis of rotation; and the popular quantities of each nation are then (by our own proportions between the Pyramid and British systems, established in Division II.) given in terms of these Pyramid quantities taken as unity. In this manner we obtain—a Table I., exhibiting in its final column, the comparative distance of each European country from the Pyramid, in weight measure. A Table II., exhibiting the same for linear measure. And a Table III.,—to which most importance is attachable,—exhibiting the countries similarly in

¹ Title,—‘Foreign Weights and Measures.—General Table of Metrical Equivalents, showing the Contents of the principal Weights and Measures in the Standards of Great Britain and France.’

order, but for the combined mean influence of both weight and linear measures ; as thus :—

TABLE I.—WEIGHT.

Name of Country or Place.	Name of Weight.	Equivalent in British grains.	Equivalent in terms of Pyramid Pound = 1.	Distance from Pyramid Pound in terms of the same = 1.
Great Pyramid,	Pound, .	7,196	1·000	·0
Prussia, .	Pound, .	7,219	1·003	·003
Spain, .	Libbra, .	7,101	0·987	·013
Portugal, .	Arratel, .	7,083	0·984	·016
Great Britain,	Pound avoird.	7,000	0·973	·027
Denmark, .	Pound, .	7,720	1·073	·073
Sweden, .	Skalpund,	6,563	0·912	·088
Russia, .	Pound, .	6,318	0·878	·122
Austria, .	Pound, .	8,645	1·201	·201
Leghorn, .	Libbra, .	5,240	0·728	·272
France, .	Kilogramme,	15,432	2·144	1·144
Turkey, .	Oke, .	19,800	2·752	1·752

TABLE II.—LENGTH.

Name of Country or Place.	Name of Linear Measure.	Equivalent in British inches.	Equivalent in terms of Pyramid Cubit = 1.	Distance from Pyramid Cubit in terms of the same = 1.
Great Pyramid,	Cubit, .	25·025	1·000	·0
Denmark, .	Ell, .	24·71	0·987	·013
Great Britain,	{ Ordnance Map, mile representative, . }	25·344	1·013	·013
Prussia, .	Ell, .	26·26	1·049	·049
Sweden, .	Ell, .	23·38	0·934	·066
Turkey, .	Pik, .	27·00	1·079	·079
Leghorn, .	Braccia, .	22·98	0·918	·082
Russia, .	Archine, .	28·00	1·119	·119
Austria, .	Ell, .	30·66	1·225	·225
Spain, .	Vara, .	33·38	1·334	·334
British Yard,	Yard, .	36·00	1·439	·439
France, .	Metre, .	39·37	1·573	·573
Portugal, .	Vara, .	43·18	1·726	·726

TABLE III.—WEIGHT AND LENGTH COMBINED.

Name of Country or Place.	Name of Weights and Measures.	Distance from Pyramid in terms of Pyramid Pound and Cubit = 1.
Great Pyramid, .	Pound and cubit, .	·0
Great Britain, .	{ Pound avoird. and Ordnance Map mile representative, . }	·020
Prussia,	Pound and ell, .	·026
Denmark,	Pound and ell, .	·043
Sweden,	Skalpund and ell, .	·077
Russia,	Pound and archine, .	·120
Spain,	Libbra and vara, .	·174
Leghorn,	Libbra and braccia, .	·177
Austria,	Pound and ell, .	·213
British Yard, . .	Pound av. and yard, .	·233
Portugal,	Arratel and vara, .	·371
France,	{ Kilogramme and metre, . . . }	·858
Turkey,	Oke and pik, .	·916

In this last table, of cumulative importance, it is not a little striking to see all the Protestant countries standing first and closest to the Great Pyramid; then Russia and her Greek, but freely Bible-reading, Church; then the Roman Catholic lands; then, after a long interval, and last but one on the list, France, with its metrical system—voluntarily adopted under an atheistical form of government, in place of an hereditary pound and ancient inch which were not very far from those of the Great Pyramid; and last of all, Mohammedan Turkey.

It is not always easy for a subject to break away entirely from his old allegiance: and when the French nation formally, or rather with a sudden violence, abolished, so far as they could, both Christianity and the week of seven days, adopting decades

of ten days instead, and in everything almost worshipping decimals,—whose crowning expression was thought to be the new metre standard, or the one-ten-millionth of a quadrant of the meridian,—they probably did not see that they had chosen a number which is the 7th power of 10; or expressible as 10^7 .*

This is the number which was likewise selected of old, in both the Great Pyramid and primitive Hebrew systems, for fixing the proportion of the cubit of the Sanctuary to the semi-axis of rotation of the earth; i.e., 10^7 sacred cubits = earth's semi-axis of rotation; and is *there* quite appropriate. But in the French metrical system, which in numerical symmetry and meaning should rather have had 10^{10} , the actual 10^7 is altogether out of place. Yet there it is, established in dominant force over the self-called pure decimal system: and while it must ever remind all Frenchmen of what they once resisted and tried to break away from,—it may typify what the better spirits among them, will by and by be coming back to, in the repentant frame of mind, and with the forgiveness, it is to be hoped, of the accepted though once prodigal son.

Britain in particular, and Israelitic warning.

But with Great Britain, too, we must have a word. Great Britain stands at the head of our scale, and it stands low down as well. The low

* From an anonymous letter, received by post on 16th March 1867.

entry is due to accepting the yard for the country's popular measure of length ; and it *is* the present legal length ; but as John Taylor, Sir John Herschel, and ourselves, have endeavoured to show, the yard is an invention of a few men in recent times, unauthorized by the spirit or antiquities of the nation ; and if other persons ever had any doubt of the importance of the remark, let them look at this Table III., and see Great Britain, by means of the yard, hurled out of all the Protestant countries, driven away from the Saxonie, Allemannic, and Scandinavian nations, and forced to a low position among Latins and Roman Catholics.

The inch, said Sir John Herschel lately, with infinite truth, is the real unit of linear measure in Great Britain ; and therewith he proposed a length of 25·025 British inches as a new and far better standard of length for the country, scientifically, than the present anomalous yard of 36 inches. Now 25·025 British inches form the length exactly of the Great Pyramid cubit, so that had the country adopted what was proposed, by its first and foremost scientist, it would have stood near indeed to the Pyramid test of the sons of Joseph. But our Government has not adopted it. We therefore insert instead 25·344 inches, as being the length introduced a few years ago, and now largely employed, in the Ordnance Survey Maps of the whole country, on the scale of 1·2500th of nature,—for the representative of one mile.

In this manner,—we fear we should say by this mere side-wind,—Britain has been placed at the top of the column. But let the island kingdom look well that it does not fall; for not only has the 25·344 inch length not yet travelled beyond the region of the Ordnance Maps,—but the Government has been recently much urged by, and has partly yielded to, a few ill-advised, but active, men, who want these invaluable hereditary measures (preserved almost miraculously to this nation from primeval time, for apparently a Divine purpose), to be instantly abolished *in toto*,—and the recently atheistically conceived measures of France to be adopted in their stead. In which case England would have to descend from her present noble pre-eminence in the metrological scale of nations, and occupy a place almost the very last in the list; or next to Turkey, and in company with some petty princedoms following France, and blessed with little history and less nationality.

‘How art thou fallen from heaven, O Lucifer, ‘son of the morning!’ might then indeed be addressed to England with melancholy truth! Or, more plainly, and in words seemingly almost intended for such a case, and uttered with depressing grief of heart, ‘O Israel, thou hast destroyed thyself!’

Well, therefore, might the venerable John Taylor, a few days before his death, exclaim, in reference to the Gallicising attempts then being made before the British Parliament,—‘If the people of this country

'does allow its hereditary weights and measures to be abolished in favour of the recent French inventions, it will richly deserve to be driven forth from its ancient land, like the Jews of old, and made a homeless and abhorred race.'

Some very well-intentioned gentlemen affect to be shocked by such expressions ; and argue soothingly that there is no reason to feel any alarm at the prospect of the French metrical system ever coming into vogue in this country,—for that the people of Great Britain would never submit to have foreign weights and measures forced upon them. But this is much like the more than proverbial attempt to cry 'Peace, peace, when there is no peace.' For at the present moment there is in force what is called the 'Permissive Bill,'—rendering it legal throughout the length and breadth of Great Britain to appeal either to French weights and measures, or English, in all commercial transactions on paper ; and the last month (February 1867) has witnessed Chambers of Commerce in London, and a meeting at the London Society of Arts, passing resolutions to recommend Government to have the French weights stamped, and rendered in every way of equal force with the English, in all practical buying and selling in shops, both wholesale and retail.

A good example of the mode in which denationalizing schemes of this order are attempted to be pushed, and what the effects would be on the nation adopting them, has recently been obtained

from Russia. For having heard rumours upon rumours perseveringly spread through this country, to the effect that Russia was on the eve of adopting the French metrical system,—I wrote lately to M. Otto Struve, the Imperial Chief Astronomer, at Pulkova, near St. Petersburg; and received from him the information, ‘that some years ago there ‘had been a little talk about the project, though it ‘was soon after entirely dropped on finding,—that ‘the proposed change would be to the advantage ‘only of a few hundreds of merchants, mostly ‘foreigners, but *to the damage of seventy millions ‘of Russian subjects.*’

This is, in fact, the true way of looking at the question of any national metrology; for it is a something which refers to the comforts, conveniences, and most useful employments of the mass of the nation, and especially of the many and the poor.

Yet in Great Britain, those who should feel most directly and immediately concerned, do not seem in any way sufficiently awake to the dangerous crisis which is passing. The heart, indeed, of the mass of the people, we are happy to believe, is not on the wrong side in these metrological matters; it is only apathetic. They have a fond regard of old for their hereditary or national measures; and when they are told of those standards’ further connexion with the ancient Hebrew, and descent from the Great Pyramid, metrologies—with all their truly superhuman earth and heaven-commensura-

bility—they exclaim, ‘How curious! how interesting! what astonishing coincidences! what wonderful accuracy!’ But they do so with folded hands, and allow these more than national heirlooms to be daily removed or destroyed, from before their eyes, by eager, industrious innovators, in fatal league with revolutionists from the other side of the Channel.

Now to have good ideas, but to employ them merely in refraining from doing active evil, was a charge brought against Israel in the time, and by the mouth, of the prophet Elijah. And it is also similar to the judgment pronounced in the New Testament against the seventh and last Church; or, as some interpret it, the Church of these the last times, and which is described in pages of infallible authority as being ‘*lukewarm, and neither cold nor hot.*’ Wherefore the first reforming command addressed to it was, ‘*Be zealous, therefore,*’ if its members would enjoy in the future new and better days.

POSTSCRIPT.

WHILE the last of the above pages were going through the press,—two letters reached me, without signature, but containing so much valuable matter connected with the Great Pyramid,—as to require more than a passing notice here.

The first of them refers to some arithmetical errors in my former book, *Our Inheritance in the Great Pyramid*. These errors had indeed already been discovered by me, and corrected in the present work; their numerical magnitude too was at no time sufficient to interfere materially with the principal results deduced;—but they were errors which should not have been committed; for which I alone am responsible; and if, perchance, there should be something

of the same kind, though of lesser degree, in these volumes,—I trust that whoever may alight on such mistakes, will follow the example of the above letter-writer,—viz., ‘repeat both the calculations and the reference to original sources for physical data,’—and then he may find with him, ‘that the theories advanced in the book, are corroborated by some *further striking analogies.*’

One of these, we have already introduced into the text on p. 596; and another, the contents of his second letter, we now append in the unknown author’s own words :—

‘ MEMORANDUM ON THE DIGITS IN π .

‘ A matter thought worth notice in connexion with π as a leading Pyramid-proportion, and with the digits 3 and 7, which are peculiar in π (as see below), being also elements in some parts of the Pyramid-analogies, and especially in the hidden and π connected part—its vertical height taken with extreme footing in encastrements, $\sqrt[3]{100}$ S. cubits.¹

18 March 1867.

‘ PECULIARITY A.

‘ Three and a Seventh is the nearest simple approximation to the ratio π .

‘ PECULIARITY B.

‘ 3 and 7 recur exceptionally among the 9 digits (of decimal arithmetic, which is man’s numeration, and therefore the matter is with reference to man) in the decimal fraction of π ,—so far as we can at present verify it, that is, to 608 places.

‘ Most of the digits recur with the usual degree of irregularity in their relative frequency. But 3 and 7 are peculiar. 3 recurs with strikingly more frequency, and 7 with more rarity than any other digits. The following table shows the details of this fact :—

Name of Digit.	Frequency of its recurrence.	Ratio per 1000 of each Digit’s recurrence. The average being 100 for each of the ten Digits.
0	60	99
1	62	102
2	67	110
3	68	112
4	64	105
5	56	92
6	62	102
7	44	72
8	58	96
9	67	110
Totals,	608	1000

¹ i.e., = 5833·33, etc., Pyramid inches; or implying a height reckoned from a horizontal plane, 14 inches nearly beneath the ‘pavement-surface;’ see pp. 82 and 140 of this volume.

‘ PECULIARITY C.

‘ This greater frequency of 3 and greater rarity of 7, than any other digits, *not only* holds true thus in the one long decimal of 608 places; but it is a more remarkable fact, as holding true very persistently in the shorter subdivisions of the decimal; even where few digits are concerned, and we should expect to find some other digits taking a turn at leading the frequency and rarity.

‘ Thus, if we go repeatedly through the decimal, and each time stop at—say 21 digits further (3×7 digits, characteristic of π ; for want of natural divisions in the fractional expression), we have as follows:—

Length of Decimal, 8'141592, etc.	Average of all digits.	Threes.	Sevens.
In the first 21 digits, the	average occurrence is $2\frac{1}{10}$, but there are,	of threes 4, and	of sevens 1
" 42 "	" $4\frac{3}{10}$ "	" 7 "	" 3
" 63 "	" $6\frac{3}{10}$ "	" 9 "	" 5
" 84 "	" $8\frac{3}{10}$ "	" 10 "	" 6
" 105 "	" $10\frac{4}{10}$ "	" 12 "	" 8
" 126 "	" $12\frac{4}{10}$ "	" 15 "	" 9
" 147 "	" $14\frac{5}{10}$ "	" 17 "	" 10
" 168 "	" $16\frac{8}{10}$ "		
" 189 "	" $18\frac{9}{10}$ "		
" 210 "	" $21\frac{1}{10}$ "		
" 231 "	" $23\frac{1}{10}$ "		
" 252 "	" 25 "		
" 273 "	" 27 "		
" 294 "	" 29 "		
" 315 "	" 31 "		
" 336 "	" 33 "		
" 357 "	" 35 "		
" 378 "	" 38 "		
" 399 "	" 40 "		
" 420 "	" 42 "		
" 441 "	" 44 "		
" 462 "	" 46 "		
" 483 "	" 48 "		
" 504 "	" 50 "		
" 525 "	" 52 "		
" 546 "	" 55 "		
" 567 "	" 57 "		
" 588 "	" 59 "		
" (608) "	" 60·8 "	" 68 "	" 44
" 609 "	" 61 "		

These further lengths of the decimal have not been examined,—from want of means of doing it.

‘ The table of Peculiarity B is taken from a letter of Professor De Morgan, in the *Athenæum* for October 27, 1866, page 543, and that letter induced its reader to make the further examination here shown —Table C.

' If it be asked, How are we to regard the foregoing mathematical facts?—as mere casual coincidences, such as, according to the laws of probabilities, *must* take place sometimes, or as in any sense designed? The true reply is, That the idea of casual coincidence and laws of probability exist only in relation to the human intellect; not in external creation taken apart from the intellect which examines it; so that, in one sense, and a very important one, there is no such thing as casual coincidence, or mere general probability. Every physical fact (whether mathematical or physical) is a necessary consequence of the working of an established order of creation; but it is not the less pre-arranged, in all its details of relations and consequences; and yet in harmony with that impression on human intellect which men term "laws of probability."

' Not a sparrow falls to the ground, nor a hair from our heads, without the Living intelligent God—the *True* God¹—foreknowing it, pre-arranging and attending to it; not merely in *general* terms, but down to the most minute detail of *each* atom and *each* event in creation, the play of its forces and motions as they be influenced by every other atom and event in creation, however insignificant, at every moment of time. This perfect forecasting and knowledge and attention baffles the utmost stretch of our imaginations. *Can* it then be true? but so also do the undeniable facts themselves, as they exist in creation,—perfect action of mutual atomic influences in endless complication and indefinite minuteness. The *true* God *must* be such, as baffles our intellect.'

¹ 'That is, the *Living* intelligent God, not an impersonal abstract deity, Pan (all things), Fate, or the unsentient laws of nature,—the rationalist's idea of God.'

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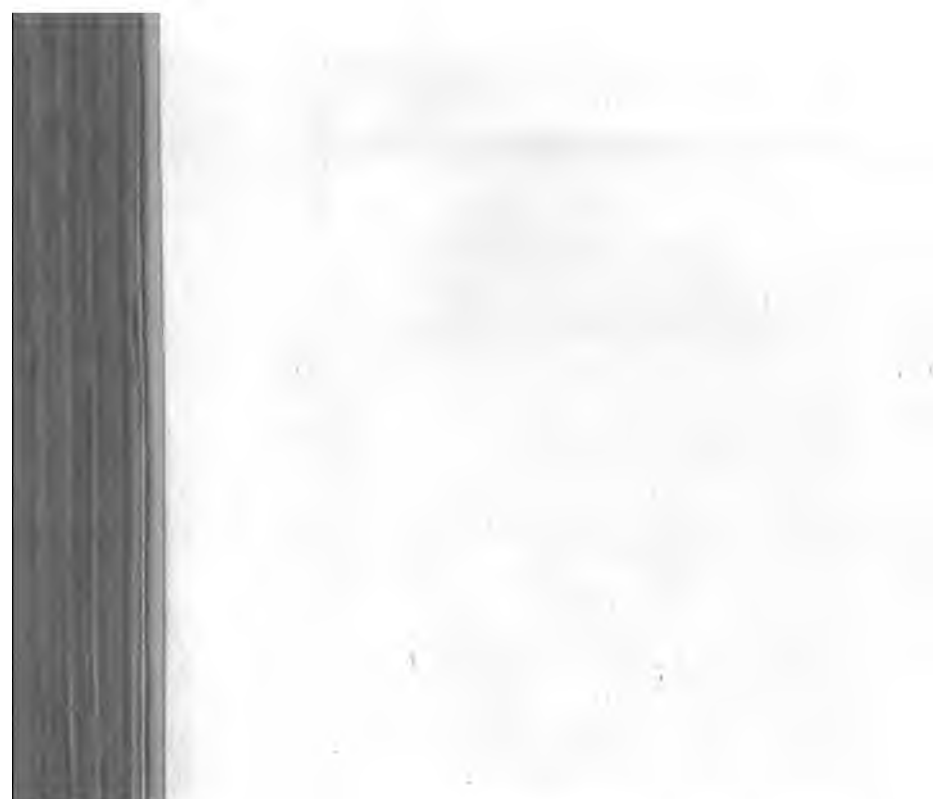
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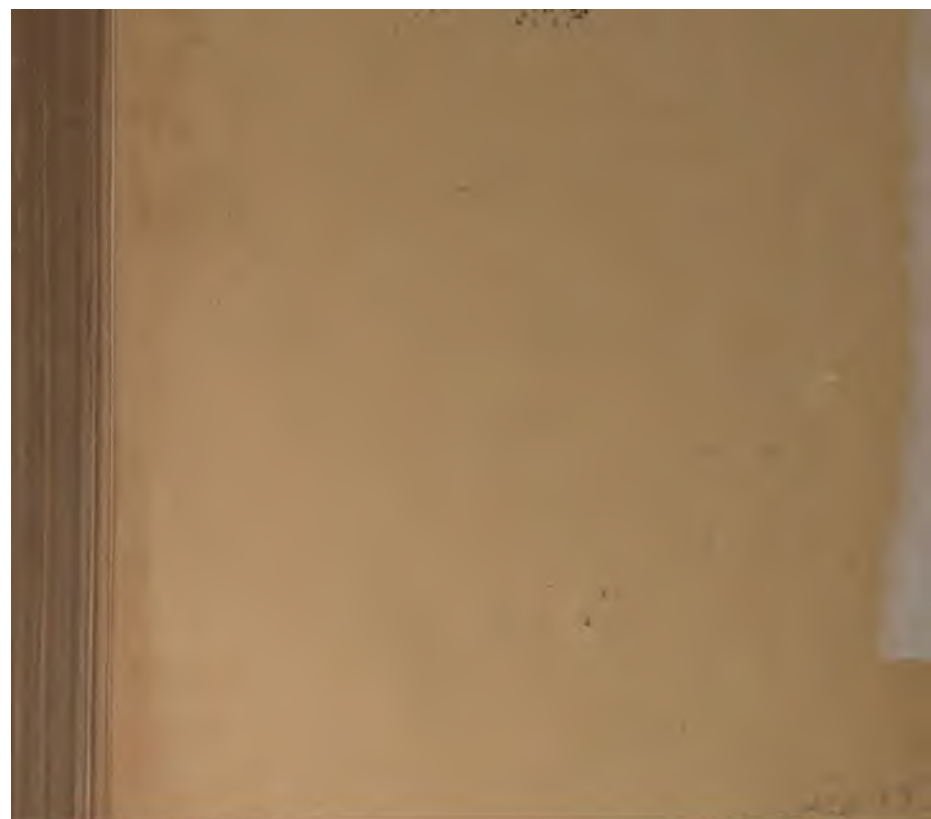
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